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Government Armor Plate Factory

Naval Ordnance Plant at South Charleston, W. Va., Compared with 1897 Project — Electric Furnaces and Heavy Cranes the Principal Improvements

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IN 1897, under authority of act of Congress approved July 19, a Navy board presided over by Commodore J. A. Howell prepared an exhaustive report upon the project to build a Government plant to turn out armor plate. At that time the Homestead works of the Carnegie Steel Co. (the United States Steel Corporation had not yet been formed) and the South Bethlehem works of the Bethlehem Iron Co., as it was then called, had the only plants in the United States capable of producing armor such as was used by the Navy.

Requirements of the Site

Then, as later, political pressure was brought to bear from all sides to have the proposed plant located at the particular points favored by those interested. It was stated officially as a desideratum, however, that the land required would comprise from 140 to 160 acres; that "the factory should be situated in a section of the country free from sudden attack by an enemy. It should be near places where the production of iron and steel are well developed, and where there is an industrial population from which skilled labor may be drawn. It should be near railroads having ample facilities for transportation to the seaboard, as well as near sources of supply of the necessary fuels. The section of country in which it is located should possess good climate throughout the year."

When South Charleston, W. Va., was selected for the present Naval Ordnance plant, these same features were thoroughly considered and the plant was located with due regard to them. It was then stated as a requirement that the plant must be west of the Appalachian Mountains, east of the Cascade and Sierra Nevada ranges, and more than 200 miles from the Canadian, Mexican and Gulf

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Charging One 40-Ton Heroult Electric Furnace with Steel from Open-Hearth Furnace. The other electric furnace appears at left. View is taken from tapping side of the two furnaces

borders. These specifications make it immune from sudden outside attack.

Quantities of Armor Involved

When the subject for a second time became a live one in 1916, there were three armor plate factories in the United States, the new member being the Midvale Steel & Ordnance Co., at Nicetown, Philadelphia. The three private plants have a combined capacity of about 40,000 gross tons of finished armor plate per year. The Government plant was to be designed for a capacity of 20,000 tons per year—a figure about half the existing capacity, which had (and has) proved adequate through the periods of greatest demand for this exacting type of product.

The largest amount of armor for which bids were ever called at any one time in the United States was 45,583 tons, designed for the protection of four battleships and four battle cruisers, on which bids were opened in the Navy Department Nov. 1, 1916. This amount would provide the three existing operating plants with full work for some 14 months. It would provide the new Navy plant at South Charleston, when completed and running full, with work for about 28 months. It is sufficient to provide the combined capacity of the four plants with work for less than one year.

Naturally enough, bitter opposition developed from the managements of the three existing plants when it became probable that the Government would erect its own plant. It was pointed out that, for a period of some 20 years, the existing plants had, on the average, had less than one-third of their capacity utilized. That means that the armor demands of the Government had run at the rate of some 8000 or 9000 tons per year.

Obviously, a duplication of facilities where existing facilities were only partly occupied was economically wrong. Not only this, but as the only possible domestic purchaser was the Government itself, and foreign orders were necessarily scarce and extremely intermittent, the existence of a Government plant where, under political pressure, the great bulk of the armor requirements of the Navy would presumably be met, would practically remove the other plants from a sphere of activity and usefulness which they had filled for many years in the past. This would result in wiping out the greater part of the $30,000,000 (more or less) invested in those plants, and in reducing the plants themselves for the most part to a state of complete obsolescence.

Considerations Favoring Government Plant

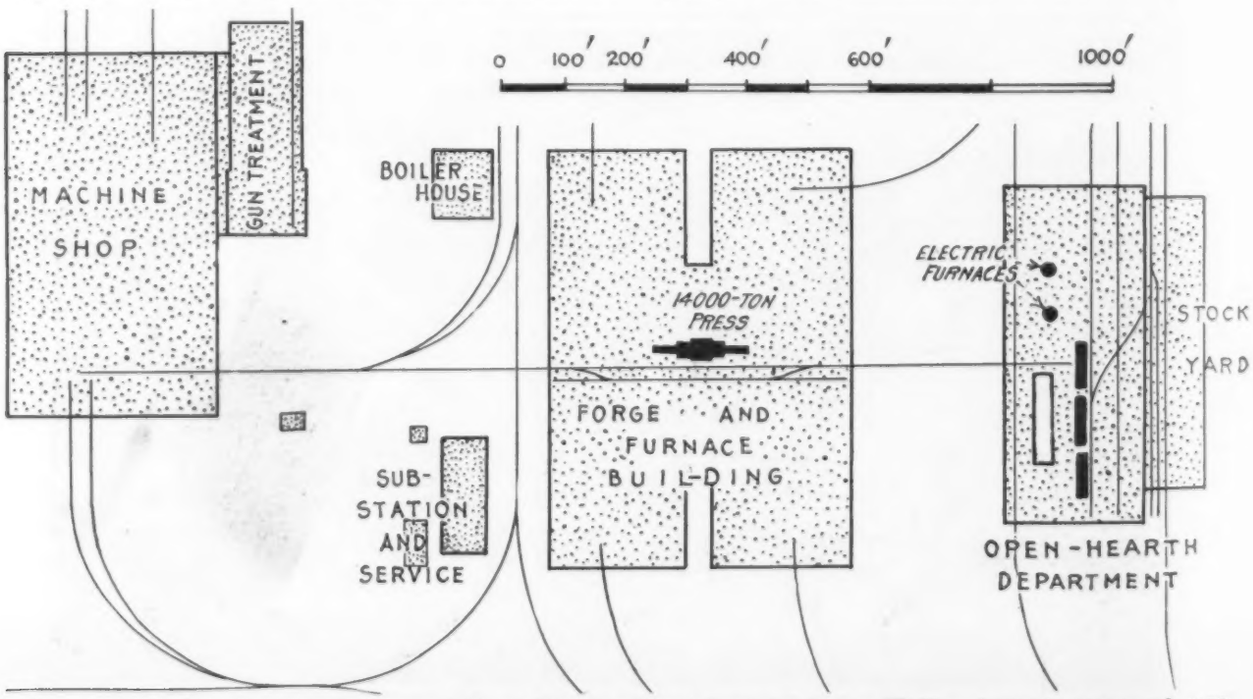
On the other hand, as steel manufacturers maintaining armor plate facilities have looked upon this feature of their business as hazardous, they have naturally not been inclined to spend large sums in experimental work. In establishing the Government plant it was felt that experimental work might well be a large item, with the possibility of greatly improving the product through the development of new processes of manufacture.

The 1897 board stated its views of the practicability of putting up a Government armor plant under the following considerations:

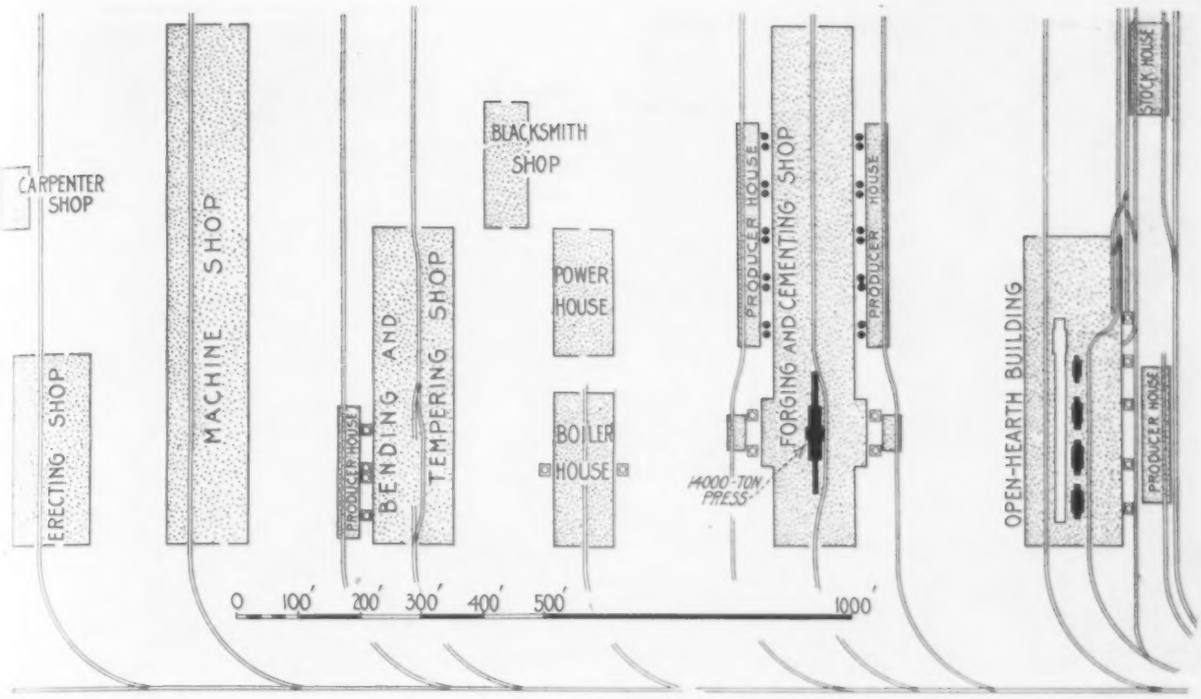
"1. An armor factory comprises essentially a collection of special furnaces, heavy machine tools and appliances that are not needed in any other class of work, and a class of labor specially skilled in the business.

"2. A Government armor factory not connected with an establishment engaged in other branches of the steel industry would depend for its success and economic administration upon a constant demand for an output nearly approaching its full capacity.

"3. If the Government should establish an armor factory the efficient and economic maintenance or working of that factory would necessarily depend upon a constant yearly appropriation for ships to be provided with armor, because the armor produced at any time must be specially designed for and fitted to those ships. Any failure to appropriate for such ships in any one year would require the cessation of work and the laying off, indefinitely, of the skilled experts and laborers that had been trained to this industry. A resumption of work at a later period would require the training, at a considerable expense, of a new set of men. In the meantime the progress of the art



Layout of the Manufacturing Buildings at Naval Ordnance Plant, South Charleston, W. Va. Armor in process of manufacture moves from right to left. Scale is 300 ft. per in., as in layout of 1897 project, opposite



Proposed Layout of Armor Plant Provided for in 1897 Report of Naval Board. Armor in process of manufacture moves from right to left. Scale is 300 ft. per in., as in layout of Naval Ordnance Plant at South Charleston, W. Va., opposite

would perhaps have been such that difficult and radical changes would be required, which under continuous working might have been gradually and easily made."

Comparison of Old Project with New Plant

Now that the new plant has been built and is already operating in part, it is interesting to compare the features proposed in 1897 by the Howell board with the features obtained in 1920-1 at South Charleston. In both cases ingots were to be made by melting cold stock in open-hearth furnaces, and from that point on through the various processes of treatment up to the finished armor plate both plants were to be completely equipped. Even the large 14,000-ton press which is being installed at South Charleston is of the same power as the 14,000-ton press specified in 1897 for the plant to be built at that time. Incidentally, it is of the same power as the 14,000-ton press then already in active use at South Bethlehem in the plant of the Bethlehem Iron Co.

While the layouts of the two plants—the one proposed and the one built—differ markedly in detail, both follow the same general lines in carrying material from the open-hearth through the forging, bending and tempering departments, and into the machine shop and erecting shop in natural sequence, and without direct retracing of its steps. The diagrams showing the proposed plant and the actual plant will bring out this point quite forcibly. It will be noted that the forge and furnace building at South Charleston has taken the place of the two buildings devoted respectively to forging and cementing and to bending and tempering in the 1897 plant. Similarly, the machine shop at South Charleston has taken the place of the two buildings labeled machine shop and erecting shop in the earlier project. And the new plant has a gun-treatment building not contemplated in the old.

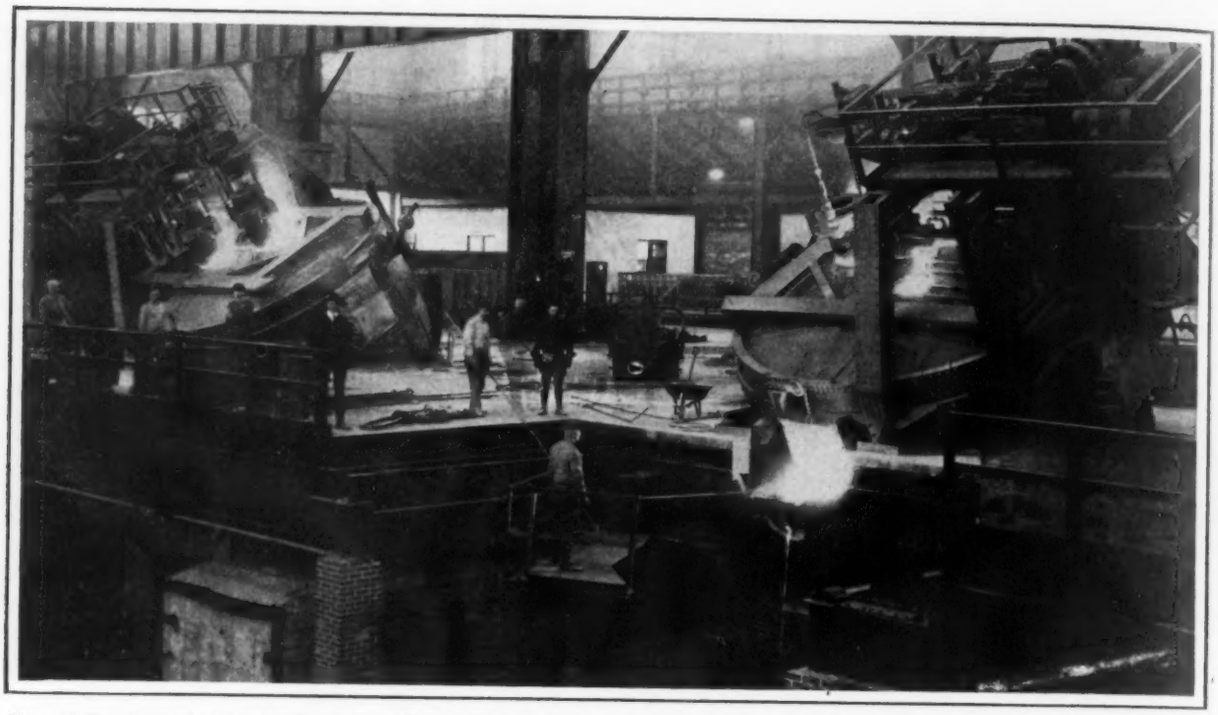
Another divergence will be noted in that the shuttle track running directly through the three main buildings at South Charleston, and used for the transfer of materials from each one to the next, did not exist in the earlier project. Its place was taken by a track outside the buildings and parallel with the location of such a shuttle track; from this outside track branch lines were carried into the several buildings. The two diagrams thus represent in a measure the advance in development of shop inter-communication which has been made during the period intervening between the two layouts.

In the earlier project no provision was made for refining the steel after it was poured from the open-hearth furnace. It is mainly in the arrangement for this purpose in the South Charleston plant that that plant acquires its great interest from a metallurgical standpoint, as well as from the spectacular. The two 40-ton Heroult electric furnaces make it possible to obtain a higher quality of ingots, and consequently a higher quality of armor, than could possibly have been obtained from the plant designed in 1897, and a quality likewise better than the best metallurgical procedure of 1897 would have permitted.

Similarity in General Features

So many features, however, in the two designs are alike or closely similar that it becomes at once evident, both that the manufacture of armor in 1897 was already a thoroughly well-established matter from the point of view of metallurgy, and also that the improvements which have been made during the intervening two decades have been mainly in detail or in "mix," and of a nature which does not call for much difference in the equipment for carrying them out. The sizes of ingots for armor plate manufacture, the sizes of the plates themselves when ready to be fitted to the ships, are almost the same now as then.

Thicknesses indeed are in some cases less, for the latest heavy armor belts in American battleships are only 14 in. thick as compared with 18 in. in the Oregon and 16½ in. in the Kearsarge. The mere fact that the length of the armor plate is now vertical rather than horizontal does not affect its size. For these reasons it is not surprising that the armor plate press should be of the same size to-day as was desired many years ago, nor that many of the other tools should also be of approximately the same power now as then.



Two 40-Ton Heroult Electric Furnaces After Pouring a Heat, Showing Angle to Which They Are Tilted. Electrode Control Gear on Top, and Juxtaposition of the Furnaces

In the one feature of cranes, however, a large advance has been made. The three heaviest cranes provided for the 1897 plant were to be of 160 tons capacity each, with another of 100 tons. At South Charleston are three cranes of 250 tons, two of 200 tons, two of 150 tons, one of 125 tons and two of 100 tons—a total of ten of 100 tons or more with an aggregate capacity of 1775 tons. In 1897 the four cranes of 100 tons and over were to have a combined rating of only 580 tons. The twenty cranes of the earlier project have given place to twenty-four in the new (twenty-one if we omit the gun-treatment division, which did not exist in the 1897 plant). The average capacity of the nineteen other "rated" cranes at South Charleston is 120 tons, as compared with an average of 77 tons for the seventeen "rated" cranes of 1897.

Open-Hearth Furnaces

In the 1897 design there were to be four Wellman open-hearth furnaces with regenerators and gas producers, and tilted by hydraulic power. They were to be so arranged that either oil or producer gas could be used as fuel. Two of the furnaces were to have a capacity of 40 tons each, the others of 30 and 20 tons. In addition, a regenerative heating furnace for preheating of materials to be charged into the open-hearth furnaces was provided for, with hearth 8 x 12 ft. It will be noted that the combined capacity of the four open-hearth furnaces of the 1897 project was only 130 tons, compared with 225 tons for the three furnaces designed for South Charleston and with 150 tons for the two furnaces already completed there.

The present 75-ton, open-hearth furnaces are provided with hearths 36 ft. long by 14 ft. wide, giving an area of 504 sq. ft. or 6.7 sq. ft. per ton of charge. This gives a somewhat shallow bath. Regenerators for these furnaces have so far been built for the air passages only, as the furnaces are run on natural gas. Each regenerator is 13 ft. high with a floor area of 25 by 14 ft. The volume occupied by checker brick is 4550 cu. ft., or a little more than 60 cu. ft. per ton of charge. Each furnace has one stack, 6 ft. in inside diameter and 150 ft. high.

Various methods of pouring ingots have been adopted in the armor factory, depending upon the class of work being produced. Some ingots are top poured; others are bottom poured. The heavy molds are provided with sand and fire brick hot tops to keep the upper portion liquid in an effort to avoid pipes.

A suggestion has been made that, after a long enough period of running to accumulate a large pile of scrap, such as crop ends and turnings from the high quality forging steel turned out by the plant, one of the basic lined open-hearth furnaces may be given a sand bottom and used for the acid process without necessity for passing the material through the electric furnaces. This projected arrangement is based upon the very low phosphorus and sulphur content of the steel now turned out by duplexing through the electric furnace, and is predicated both upon a continuation of such metallurgical results and upon the accumulation of enough high-grade scrap to run the furnace on its acid lining through a considerable period of time.

A casting pit 20 ft. deep and extending about 330 ft. down through the center of the open-hearth plant, almost directly under the furnace spouts, was arranged for in 1897, the width of the pit being 17 ft. over almost the whole length, with a 20-ft. width over a length to 36 ft. near one end. This is very much larger than the casting pit provided at South Charleston, which is about 140 ft. long and 30 ft. wide, with a depth of 16 ft. over about two-thirds of the length and 8 ft. for the remainder.

Electric Furnaces

Quality of forging steel is of paramount consideration. None of the commercial armor manufacturers in the United States uses electric furnaces for refining armor steel. By the inclusion of two large furnaces for this purpose at South Charleston the limitations due to the use solely of the open-hearth process have been done away

with, with resultant large improvement in many features of steel quality.

In developing high-grade alloy steels the electric melting furnace has placed in the hands of the steel maker a metallurgical tool far in advance of either the basic or the acid-lined, open-hearth furnaces. It not only eliminates the greater part of the phosphorus and sulphur which these furnaces still leave in the final product, but also with its reducing atmosphere permits the steel in the furnace to be alloyed with such rare elements as chromium, molybdenum, zirconium, vanadium, tungsten, titanium, etc., with the practical certainty of getting a definitely calculated percentage of these elements in the final steel, instead of having them largely oxidized, as would be the case in the open-hearth furnaces. This avoids also lack of certainty of getting a homogeneous mixture, which would accompany adding these elements in the ladle.

Each electric furnace is confined within a steel shell 18 ft. in diameter outside the lining and 8 ft. high, provided by the American Bridge Co. The brick lining walls are 18 in. thick with a layer of 1½ in. of dry sand between the brick and the shell of the furnace. The 24-in. electrodes in use are of amorphous carbon operated by General Electric Co. regulators and equipped with 5-hp. motors for raising or lowering.

Tilting of the electric furnace takes place on large rollers or spools arranged on the periphery of a circle, of which the center is approximately at the center of gravity of the furnace. The motion is somewhat similar to that of a rocking chair. The circular base casting carrying the furnace rests upon the eight steel spools and is operated by a large driving gear by means of a 35-hp. motor.

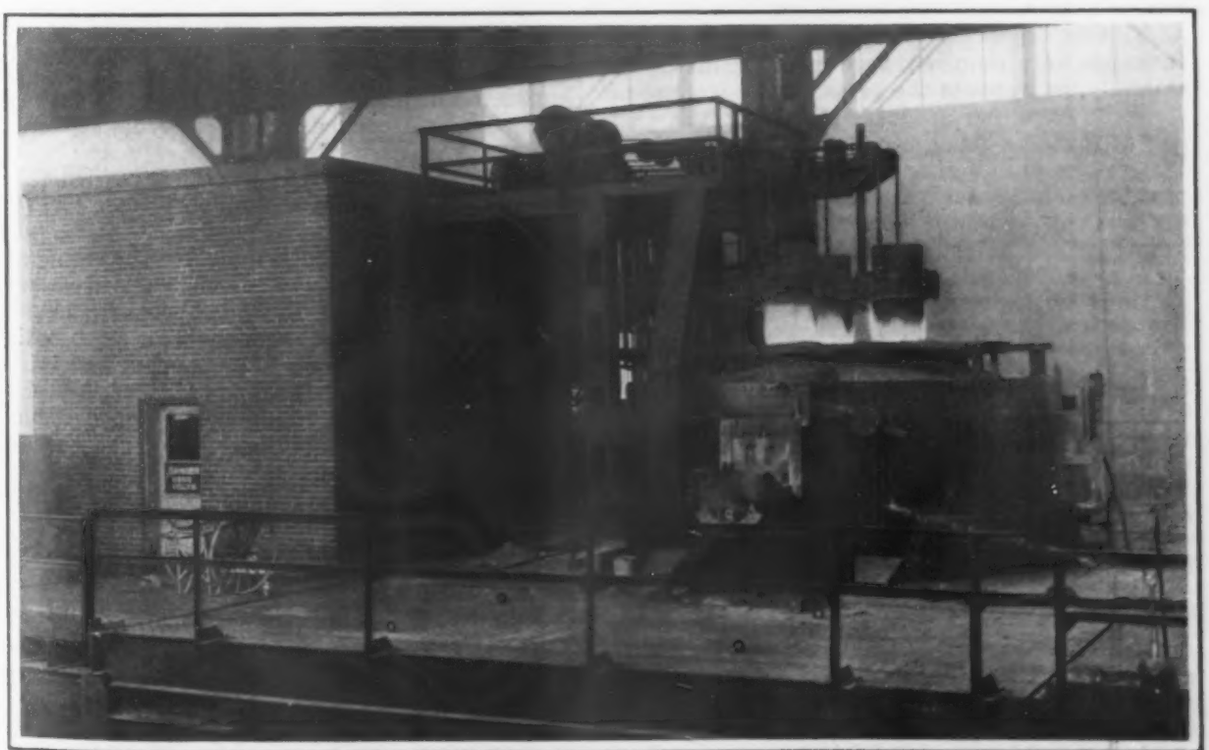
Operation of the Electric Furnaces

Both furnaces draw about the same amount of current from their respective oil-cooled transformers, which drop the pressure from a line voltage of 6600 to a furnace voltage of 110. Each transformer, of General Electric Co. make, is rated at 3000 kva., at a 90-per cent power factor. In practice the power factor has been running fairly steadily between 85 and 90 per cent. The current consumption varies during the heat from 2500 to 1500 kva., the larger amount being required at the start of the heat, when something of a skull is sometimes formed temporarily in the furnace bottom, due to chilling of the entering steel.

Sulphur in the finished electric steel is running from 0.008 to 0.015 per cent. One heat showed only 0.006 per cent; several have given 0.007 per cent. These low figures are due in part to the high temperature carried, in part to the fact that the bath is subjected to a reducing action in place of the oxidizing action of the open-hearth, in very large part to the fact that the bulk of the scrap charged into the open-hearth furnace is already of low sulphur content, for the greater part of it is the "home" product of the plant itself. Phosphorus is brought down by the regular open-hearth practice to about 0.015 per cent and shows slightly higher in the electric steel, due to "dilution upward" from the ladle additions of ferromanganese and ferrosilicon.

Temperatures prevailing in the Navy electric furnaces are more moderate than is found in some other plants. The steel temperature is held at about 3000 deg. Fahr. for tapping, which is only some 250 deg. higher than usual open-hearth practice (the great bulk of the steel being between 0.30 and 0.50 per cent carbon). The "skim" test for temperature is used, with a 15-minute period aimed at for the surface skim to form over a test spoon of steel drawn from the furnace. This compares with periods of 25 minutes and 40 minutes respectively at two other notable American electric furnace plants. As nozzles are used for 2½-in. streams from the open-hearth ladles and 2-in. streams for steel from the electric furnaces, a teeming temperature can be used which might be considered "cold" by other practice.

Experimentally, one of the big electric fur-



Tapping Side of 40-Ton Heroult Electric Furnace, with Transformer House at Left, Where Three-Phase Current at 6600 Volts Is Stepped Down to 110 Volts for Furnace Use, at Which Pressure It Reaches the Three Electrodes Through the Mass of Cables Shown in the Shadow

naces is now equipped with 14-in. graphite electrodes, while the other retains the 24-in. carbon electrodes, with which both were started. It is hoped, in due course of time, to learn much about both types of electrodes in this way, for the two furnaces will be on practically identical service and will thus furnish a direct comparison. The clamps holding the electrodes are sufficiently flexible to permit, with the aid of shims, this considerable variance in electrode diameter.

Refining in the electric furnace, based on ferrous content, shows a loss of about 1 per cent. The corresponding figures for running the metal through the open-hearth furnace is 5 to 6 per cent. These figures, which are obviously independent of the present intermittent operation of the melting units, are quite normal practice. The running of the double slag—from the open-hearth and from the electric furnace—assists materially in the ultimate refinement. The slag from the electric furnace provides a very fair quality of carbide of calcium from which acetylene can be made. Care is naturally taken that this slag does not come in contact with any quantity of water.

It is not yet possible to forecast the probable life of roofs and bottoms in the open-hearth furnaces. The two furnaces now completed are fitted with sectional ribbed roofs, 12 in. thick. The ribs are inserted to divide the roofs into sections and thus facilitate patching if necessary, with the idea of lengthening the working life of the roof as a whole. The 6-ton Heroult furnaces in the projectile plant, however, which have been running for some period, have shown an average life of about 105 heats per furnace bottom and 115 heats per furnace roof, with a maximum of 127 on each.

Heavy Armor Forging

In the 1897 project, the large press was required to be capable of exerting a maximum pressure of 14,000 gross tons. The vertical rise of the ram was to be 10 ft. and the distance between housings or columns 14 ft. This press was designed also to be fitted with two side rams, each capable of exerting a pressure of 4000 tons and having a horizontal ram movement of 4 ft.

To heat ingots for this press four regenerative furnaces were required, two on each side of the building and opposite the press. They were to be arranged for either producer gas or oil fuel, each pair of furnaces being provided with one producer outside the building, and with a separate smoke pipe for each furnace. These furnaces, with doors operated by hydraulic power, were to be 16 ft. square, with a height of 9 ft. 6 in.

Four additional regenerative furnaces were provided for heating armor plates for reforging. These furnaces were also arranged to use producer gas or oil and each pair was to have a producer outside the building. Each was to be fitted with a movable or car bottom, which together with the doors was to be operated by hydraulic power. The track for the car bottom was to extend under each furnace and out to the center of the shop.

Massive foundations are already in at South Charleston for the 14,000-ton hydraulic press, which is to be operated with the aid of steam intensifiers, and the battery of boilers is being installed. The cast steel foundation members run about 20 ft. below the floor of the shop, and the concrete footings far below that, bearing on rock 60 ft. below the floor. The press, which has a maximum working stroke of 7 ft. 6 in., is a product of the Mesta Machine Co. The 30-in. columns are spaced 19 ft. by 8 ft. 6 in. on centers. As it is reported that orders for 800 tons of heavy armor, of the barbette and conning tower type, which involves thicknesses of perhaps 16 in., require delivery in October, the press will be completed and put into service as rapidly as possible.

Three ingot-heating furnaces, two reforging furnaces and one rectifying furnace, serving the big press, are all 15 ft. wide inside, with an inside height of 14 ft. 6 in. from floor to top of arch. The reforging and rectifying furnaces are 36 ft. long inside, the ingot furnaces being considerably shorter. All are of the regenerative car-bottom type, burning natural gas and using preheated air.

Heat Treatment Equipment

Sixteen regenerative cementing furnaces were arranged for in the 1897 plant, each pair to have a producer outside the building. Here, again, either producer gas or oil was to be used, and the furnaces were to have car bottoms and tracks as before. Eight of the furnaces were to be 30 x 14 ft.; the other eight 22 x 14 ft.

Three tempering furnaces with removable top and ends were to be provided, each 27 ft. long and 12 ft. high. Two were to be 9 ft. wide and the third 14 ft. They were to be fired by wood or coal along the sides.

Apparatus was designed for spraying filtered ice water against the cemented side of the plate, and water of normal temperature against the other side simultaneously. For oil tempering an oil tank was to be provided below the floor, about 30 ft. in diameter and 15 ft. deep. Another tank of about the same size was to be placed outside the building, with arrangements for cooling the oil. An annealing pit, 20 x 30 ft. by 15 ft. deep, was also included in the design.

At South Charleston the three carbonizing furnaces, three annealing, eight tempering and one hardening furnace in the north aisle have the same cross section as the six ingot and other furnaces in the south aisle. Inside lengths vary from 36 to 50 ft. All are regenerative, car-bottom type, using natural gas and preheated air.

For quenching armor plate a reinforced concrete spray pit has been provided, 16 x 32 ft. by 8 ft. deep. An armor plate, taken from the adjacent hardening furnace and placed on suitable supports in the pit, is drenched with spray from above and below. A grillage of pierced pipes near the bottom of the pit, and a similar grillage carried above the plate by a carriage straddling the pit, together will discharge 25,000 gallons of water per minute.

Inspections are made by regular Navy material inspectors in all respects as though it were a private plant. Three test pieces are customarily taken from the end of each forging. The hollow trepanning drill, leaving the core for test, is run in by the shop, but the test piece itself is broken off by the inspector, whose own force then turns the piece to shape and size, makes the test and passes or rejects the piece. It is as entirely out of the hands of the operating department, from the time the piece is broken from the forging, as though that department had no further interest in the matter.

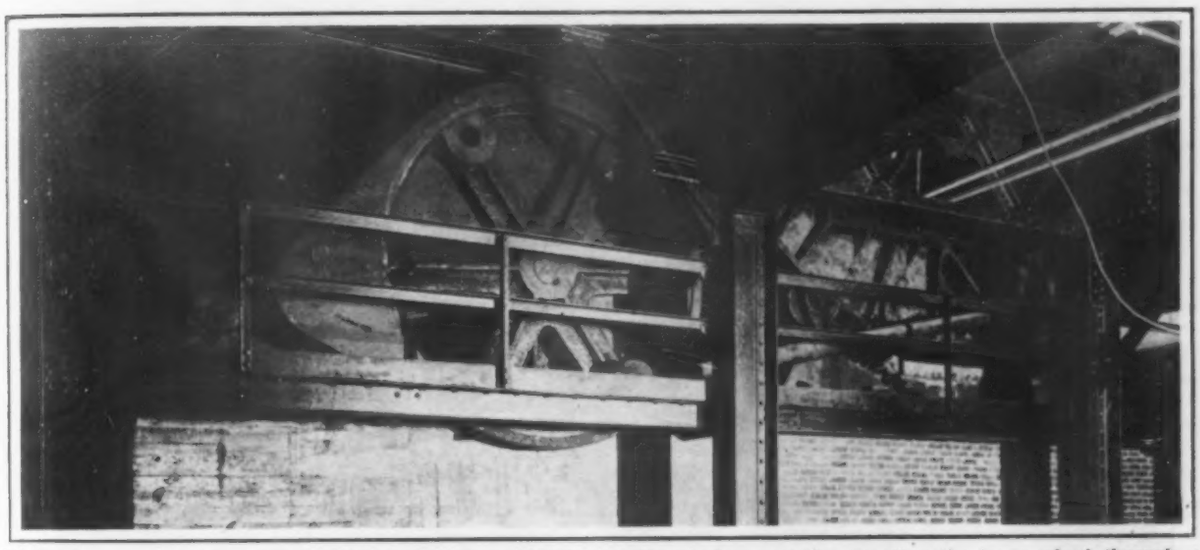
Cost of Building the Plants

In estimating upon the probable cost of a plant capable of making 6000 tons per year of nickel-steel armor with hardened face, the 1897 board prepared a figure amounting to $3,748,000, exclusive of the land. Of this amount $950,000 was for buildings and $2,798,000 for machinery, fur-

naces and stacks. It was recognized then, as now, that the size of the largest single armor plate to be produced fixes the size and number of the melting furnaces required, and the size of the forging and bending presses. As the melting furnaces and the presses thus determined are capable of a much greater annual production than 6000 tons, it follows that the cost for a plant of greater annual capacity than that figure would be less in proportion to its product than the plant under consideration, for no increase might be required in these items.

In that original estimate it was figured that the open-hearth department for producing ingots would cost $519,000, or about 14 per cent of the entire plant. Inasmuch, however, as this would make it possible to produce right in the plant ingots which would have uniform quality, it was felt that the open-hearth department should be installed as an integral part of the complete plant in preference to purchasing forging ingots outside.

Estimates for the present plant placed the total cost at $10,332,000, including engineering expenses. In this figure were $1,058,000 for the open-hearth, $2,728,000 for the forging and bending shop, $1,912,000 for the cementing and tempering shop and $1,745,000 for the machine shop. These were the estimates of 1917 based upon the naval appropriation act of August 29, 1916, which carried the sum of $11,000,000 for a plant of 20,000 tons annual capacity. As these figures were prepared at a time when both labor and material, but particularly labor, were costing far less than they cost when the plant was actually built, it is probable that they largely underestimated the actual cost of construction.



Tilting Gear of a 40-Ton Heroult Electric Furnace. Motor is in the shadow at left, operating the large wheel through a train of spur gears. Furnace rocker, at right, is actuated by connecting rod from the large wheel, and runs upon rollers, one of which appears just above connecting rod

Comparative Areas of Buildings (Sq. Ft.)

Department	1897 Project	South Charleston
Open-hearth	94,386	116,100
Forging and cementing	113,323	307,188
Bending and tempering	65,650	
Machine shop	108,730	176,088
Erecting shop	39,955	
Manufacturing	422,044	599,376
Blacksmith and pattern	19,471	58,571
Maintenance and locomotive	6,604	30,625
Boiler and power houses	42,336*	82,500
Auxiliaries	68,411	91,696
Gun treatment	.....	34,132
Stores	.....	58,371
Grand total of above	490,455	783,...
Designed capacity, tons	6,000	20,000
Area per ton, sq. ft. total	82	39
Forging, cementing, bending and tempering	30	15

*This contemplated generation of electric power; at South Charleston it is purchased.

Export Duties on Wabana Iron Ores

Discussing the bill before the House of Assembly in Newfoundland, proposed to confirm an agreement between the Dominion of Newfoundland and the steel companies in Cape Breton, now forming part of the British Empire Steel Corporation, *Iron and Steel of Canada* says:

This is an important measure, which reflects a desire, actuated largely by necessity to pay Newfoundland's heavy war expenditures, to obtain a greater revenue from the iron ore deposits of Wabana that form so large a proportion of Newfoundland's sources of material wealth. The ore deposits are owned in fee simple by the associated steel companies, and royalties cannot be imposed, which explains the imposition of export taxes. The agreement is important to the companies interested inasmuch as it limits their liabilities arising from projected increase of iron ore output to a prescribed amount during a stated period, and this is an advantage where electoral governments change quickly.

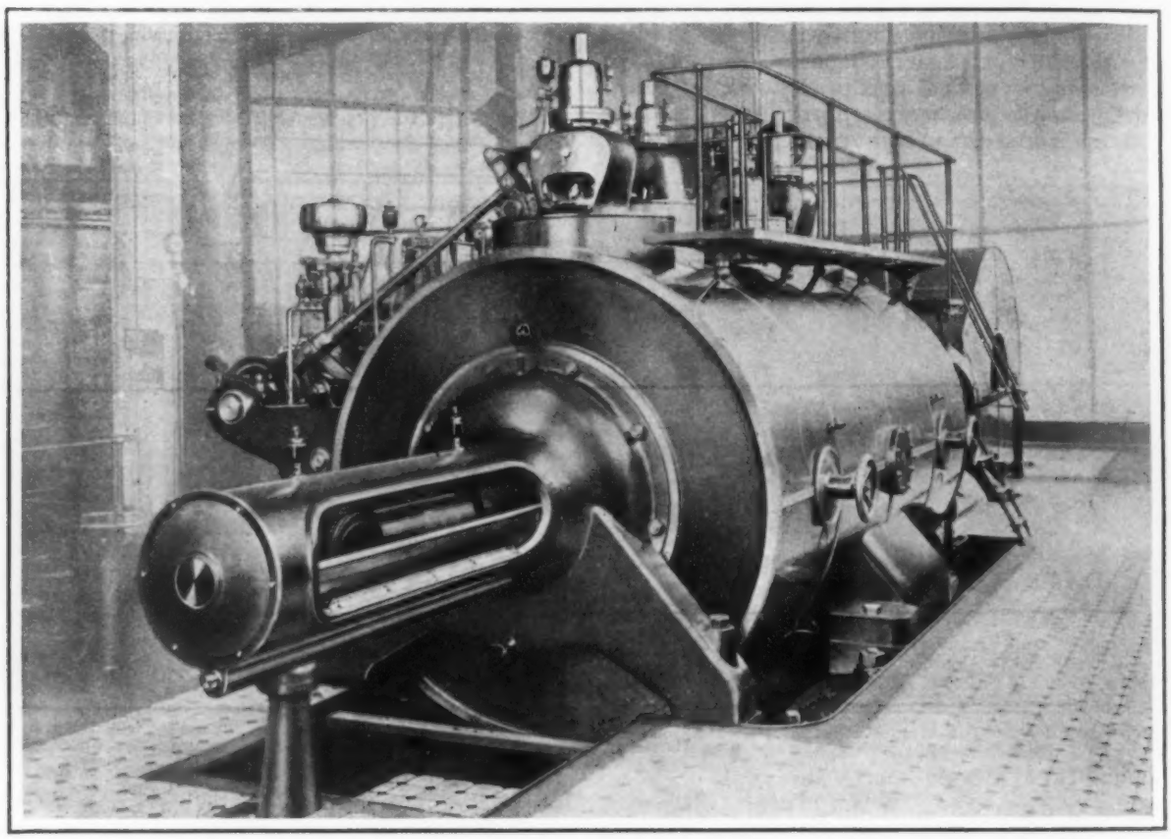
The provision which refers to a projected blast furnace plant in Newfoundland has probably in mind certain affiliations with British steelmaking companies, and changes in the British coal industry that might make it preferable to ship pig iron from Newfoundland instead of ore, although such a proposal would involve the bringing of coal to the blast furnaces from Cape Breton, or other point of supply. Should this project not be consummated, however, the burden of the agreement would appear to be that a maximum export tax of 10c. per ton will be imposed on iron ore shipped to points other than points in Nova Scotia. Newfoundland benefits immediately by an increase from 7.50c. to 25c. per ton upon ore shipped to Nova Scotia. Normal operation of the Cape Breton steel plants would call for annual ore shipments of between 800,000 and 1,000,000 tons.

Thomas J. Kelley, secretary Employers' Association of Hartford County, Conn., in his annual report says: "Thus far in Hartford County the industries represented in this organization have been able to keep 46,000 workers employed. There are on the payrolls of our membership at present approximately 50,000 workers, a decrease of 30 per cent from the high level of 1920. The average running schedule of Hartford factories is 41 hours; for New Britain and Plainville districts, 36; for Southington, 36¾; for Bristol, 39 2/3; for Windsor Locks, 36, and South Manchester, 48. The present average running time for the county is 39 2/3 per week, a 22 per cent average reduction.

Single-Cylinder Mill Engine

What is described as perhaps the largest machine of its kind on the European continent is the single cylinder engine, shown in the illustration, and used in one of the Rhenish steel works to drive a 3-high rolling mill. The engine was built by Ehrhardt & Sehmer, Saarbruecken, under guarantee of a steam consumption of under 11½ lb. per hp. hr. with a steam pressure of 110 lb. per sq. in. and superheat of 228 deg. Fahr.—a total temperature of 572 deg. Fahr.

The one cylinder has a diameter of 67 in. with a stroke of 55 in., and operates at a maximum of 130 r.p.m., under a normal steam pressure of 118 lb. per sq. in. It has four inlet valves and works on the uniflow principle. The normal power is given as 4000 hp., with the possibility of reaching a maximum of 8000 hp. Under test the steam consumption guarantee was met at 102 lb. per sq. in. and 2700 hp., and undoubtedly would be considerably bettered at full power.



This Single-Cylinder Rolling Mill Engine Is Capable of 8000 Hp. Maximum in Driving a Three-High Mill

It is understood that the engine was so designed that a liner could be fitted in the cylinder, reducing the piston diameter to 57 in., and giving the same power by raising the steam pressure to 175 lb. per sq. in. The weight of the cylinder is 40 tons, of the crankshaft 30 tons and of the flywheel 90 tons.

Expediting Publication of Statistics

WASHINGTON, May 24.—For the purpose of giving more effective service, the Department of Commerce, beginning with the April number, will issue the monthly summary of foreign commerce in two parts, enabling quicker publication of the more important information. Part I will contain the figures most urgently needed by the trades and will include imports of merchandise by articles and the principal countries and exports of merchandise by articles and principal countries, followed by an index by articles and a statement of total imports and exports, including gold and silver shipments. These detailed figures will be published on or about the twenty-third of the succeeding month, the department has announced, so that these figures of detailed foreign trade will become available from two to four weeks earlier than before. Part II of the summary will contain the remainder of the tables which have been appearing in the regular monthly edition. The publication of this second section will not be delayed beyond the date on which the whole summary has been appearing.

The preliminary summary statements issued to the press will be given out from 10 days to two weeks sooner than previously. In other words, the first summary statement of imports and exports will be given out within 10 or 12 days after the close of the month.

This expediting of the monthly figures has been effected without additional cost to the Government, as the result of some changes in compilation methods. In this improvement the department states it has had the effective support of the Treasury Department, which furnishes the original data from which the customs statistics are compiled.

The purchasing agent has been analyzed as to his qualifications for New York Purchasing Agents' Association by Dr. Holmes W. Merton. When he has a technical field to cover, he becomes at once, according to Dr. Merton, a financial agent and a scientist or mechanician. He is called upon to pass upon the quality of his purchases, whether these are the raw materials of his producing concern or the finished product of his selling concern. He therefore needs a technical education or its equivalent in experience, or both. With him, then, construction-imagination and skillfulness are mental necessities of the first order. But these must be backed up and controlled by stability and caution, or they will run away with him, lead him into overbuying or erratic proportion in stock purchases.

The decline in the operations of metal working shops in Milwaukee, Wis., is indicated by reports from 44 plants for July, 1920, and for March and April, 1921. During July, 1920, there were employed in 44 shops, 19,218 men, working 52½ hr. per week, with some overtime. During March, 1921, there were employed 15,429, working an average of 42 hr. per week. During April, 14,107 men worked an average of 41.3 hr. per week.

French Specifications for Carbon Steels

Full Details for Bars, Blooms, Billets and Slabs of Other Than Tool Steels — Static, Structure and Shock, As Well As Welding Tests, Required

A TRANSLATION of the French specification No. A2—1—U. F., and an example of the specifications prepared by the French Permanent Commission on Standardization follows. A short account of this commission and its work was given in THE IRON AGE, Dec. 2, 1920.

Article 1, General Provisions

1.—*Object of the Specifications:* The present specifications define the conditions of acceptance of regular products including bars and simple sections (rounds, squares and flats) blooms, billets and slabs, obtained by rolling or forging the different kinds of carbon steels, with the exception of tool steels.

2.—*Classification of the Steels:* (a) The classification of the steels by grades is based on the tensile strength of annealed test pieces as given below in Article 6, paragraph 4. In this classification the mimimum tensile is taken as the principal characteristic and serves to distinguish the grade. (b) The orders will specify (with the exception noted below in c) one of the five grades shown in the following table.

Minimum Tensile Strength	Elongation Corresponding to This Minimum Tensile Per Cent in 3.94 In.
35 kg. per sq. mm. (49,780 lb. per sq. in.)	30.0
40 kg. per sq. mm. (56,891 lb. per sq. in.)	28.0
48 kg. per sq. mm. (68,270 lb. per sq. in.)	24.0
55 kg. per sq. mm. (78,226 lb. per sq. in.)	20.0
70 kg. per sq. mm. (99,560 lb. per sq. in.)	13.0

(c) For tensile strengths above the minimums given, the corresponding elongation A will be determined by the formula $R + 2A = 95$ (R being tensile strength in kg. per sq. mm.). However, the elongation defined by this formula for each grade must not be less than the minimum tensile strength specified for the following grade.

3.—*Drawing up of the Orders or Contracts:* (a) After having shown the dimensions of the products and the number of the bars or the total weight of each sample, the orders will show the grade of metal required. For this they will show:

1. The specification to use, giving its number in the series of the standard specifications and the date of its publication.
2. The minimum tensile strength required for the steel. The indication of the minimum tensile strength will establish the other requirements of the tensile test, according to preceding paragraphs, namely, the maximum tensile strength and minimum elongation.

(b) The orders may require or except certain processes of manufacture (open-hearth process, crucible process, etc.).

(c) The welding test not being required usually, the orders should show by the words "weldable steel" the shipments on which this test is one of those required for acceptance.

(d) For certain shipments of round bars, the orders may ask for certain reduced tolerances in dimensions by mentioning this specially.

(e) Inversely, for certain shipments the tolerances in dimensions may be increased to show values explicitly given in the orders.

(f) The orders may specify that a particular mark is to be hot stamped, at the time of rolling, on the ends next to the top discard, so that tests for internal structure may be carried out on an end of the bar properly chosen and the maximum guarantee of sound structure obtained.

Article 2, Manufacture

1.—*Process of Manufacture:* The process of manufacture of the steel shall conform to the requirements shown on the order (open-hearth process, crucible process, etc.). In the absence of requirements of this kind the producing plant will have free choice of the process of manufacture.

2.—*Reduction:* In any case the products furnished should not have a cross section greater than one half of the corresponding section of the ingot from which they are made.

3.—*Discard:* The products, ready for shipment, should be completely free from defective parts coming from the top or the bottom of the ingots, and from all trace of pipe. The test for structure is to verify this condition.

4.—*Inspection:* The inspectors should have free entry into the shops of the producing plant where is carried out the manufacture of the products that they are to inspect.

They should be allowed to stamp a certain amount of the material while it is being made, where this is not incompatible with normal practice and when the order requires it, so as to be able to follow the material from one operation to the next, especially in view of the choice of bars from which tests for internal structure are to be made.

Article 3, Presentation of the Products

1.—*Formation of Lots:* The products presented for inspection shall be separated into lots coming from one heat. Each lot shall consist of at least 10 metric tons.

2.—*Presentation:* The presentation for inspection will be made by a note given to the inspector. This note, duly signed and certified under responsibility of the manager of the producing works, will show the details of the order, and will constitute a certificate attesting that the conditions of manufacture covered in paragraphs 1 and 2 of Article 2 have been observed. Further, it will confirm that the products have not been previously presented for inspection for the same use.

Article 4, Exterior Examination

1.—*Examination of the Surface:* (a) The surfaces should be free from cracks, laps or inclusions of foreign material penetrating further than the allowable limits of dimension tolerances.

(b) The surface defects should be completely removed by chipping or grinding. If the loss of metal resulting exceeds 10 per cent for the blooms and billets, or the allowable dimension tolerances, the inspector may authorize shipment if he judges the defects without importance for good use of the material.

(c) The ends of the bars may be cut by the usual methods; the shear, hot saw or cold saw.

(d) The bars should be straightened so that there is neither local wave nor camber greater than 1.2 mm. per meter of the total length of the bar (0.043 in. per yd., slightly less than 3/64 in. per yd.).

2.—*Dimension Tolerances:* (a) Lengths. For bars ordered of fixed length there will not be allowed anything under. The tolerance over is limited to 30 mm. for bars 5 m. and less with an addition of 10 mm. for bars longer than 5 m. (1.181 in. for bars up to 16 ft. 4.85 in. and 1.575 in. for bars over 16 ft. 4.85 in.).

(b) Transverse dimensions: The tolerances relative to transverse dimensions are fixed by the following table:

Roller Bars: Plus or minus 2 per cent, but the tolerance must not exceed 3 mm. (0.118 in.) nor be less than 0.3 mm. (0.012 in.).

Hammered Bars (rounds, squares and flats): Plus or minus 3 per cent, but for rounds the difference between two diameters of the same bar must not exceed 3 per cent.

Slabs: Plus 5 per cent, minus 2 per cent.

Blooms, Billets: Plus or minus 2 per cent.

(c) Reduced tolerances: For certain shipments of

rounds the tolerances may be lower than given above if so stated in the order.

(d) Angles of flats and squares: The angles of flats and squares with thickness equal to or greater than 80 mm. (3.15 in.) may be slightly rounded. The radius of the rounding will be limited to 4 per cent of the thickness of the bar.

Article 5, Definition of Tests

1.—*Kind of Tests:* (a) The steels will be subjected to the following tests:

1. Test of structure.
2. Tensile test (on annealed test pieces).
3. Bend test (on annealed test pieces).
4. Shock test on un-notched bar (on annealed test pieces).
5. Welding test (if specified in the order).

(b) The number of tests will be a test of structure, tensile test, bend test and shock test per lot. The number of tests of structure may be increased if specially mentioned in the order.

(c) A welding test per lot will be made when the order specifies that the steel should be of welding grade.

2.—*Method of Carrying Out Tests:* The tests shall be carried out in conformity with the Standard Collection of Methods of Mechanical Testing.

Article 6, Preparation of Test Pieces

1.—*Method of Taking Test Pieces:* (a) The samples for the mechanical tests will be, in principle, cut cold from the bars chosen by the inspector. They will be taken lengthways, and the axis of the test piece should be midway between the surface and axis of the bar, or as near as possible to this position if the dimensions of the bar are too small to allow this condition to be exactly realized.

(b) However, for the products covered by the present specifications and which are capable of being reforged, the test pieces may be prepared by forging or rolling. Pieces so obtained should have a cross section about 20 per cent greater than the greatest cross section of the finished test piece. The test pieces will be afterward cut cold from the forged or rolled pieces.

The test piece may be cut with a blow pipe from blooms or billets if at least 15 mm. (0.591 in.) of excess metal is left to be removed cold.

2.—*Dimensions of Test Pieces:* (a) The dimensions of the test pieces to be used for the various tests are given in the standard collection of methods mentioned before.

(b) Bars too small to give tensile tests 9.77 mm. (0.384 in.) diameter will be tested as rolled; the length, L, between punch marks being always determined in function of the section S by the formula:

$$L^2 \text{ (in mm.)} = 66.67\ S \text{ (in sq. mm.)}$$

(c) Bars with a transverse dimension below that required for the bend test will be tested as rolled or forged.

(d) Bars too small to give a test piece 20 x 20 mm. for the shock test will not be subjected to the unnotched bar shock test.

(e) Bars too small to give a test piece 15 x 15 mm. will not be subject to the weld test.

3.—*Marking of Test Pieces:* The samples taken for preparation of the test pieces will be laid out, punched and stamped under the control of the inspector. While preparing the test pieces the stamps should not be removed and replaced except in presence of the inspector.

4.—*Treatment of Test Pieces:* After machining, the pieces for tensile, bending and shock tests should be reheated in a furnace at a temperature between 850 and 900 deg. C., held for 15 min. at that temperature, then cooled slowly in the air.

Article 7, Results Needed in the Tests

1.—*Test of Structure:* The examination of the structure should not show any break in continuity, or any cavity or inclusion of foreign matter in the mass of metal subjected to the test.

2.—*Tensile Test:* All the pieces tested should satisfy the minimum and maximum tensile requirements and minimum elongation, as shown in the order and required in paragraph 2 of Article 1.

3.—*Bend Test:* The pieces tested after annealing should give the results shown in the table below, without any fracture of the exterior surface, or breaking in two:

Tensile Strength	Bend Required
Up to 48 kg. per sq. mm. (68,270 lb. per sq. in.)	180 deg. Flat
48 kg. up to 55 kg. (78,226 lb. per sq. in.)	180 deg. x 1 d.
55 kg. up to 70 kg. (99,560 lb. per sq. in.)	180 deg. x 1½ d.
70 kg. and above	180 deg. x 1½ d.

4.—*Shock Test on Un-notched Bars:* (a) The test pieces 30 x 30 x 200 mm. (1.18 x 1.18 x 7.874 in.), placed on supports 160 mm. apart (6.299 in.), should support without breaking 15 blows of a tup weighing 18 kg. falling from a height of 2.5 meters (39.68 lb. falling 8 ft. 1¼ in.)

(b) The test pieces 20 x 20 x 150 mm. (0.787 x 0.787 x 5.906 in.), placed on supports 120 mm. apart (4.724 in.), should support without breaking 15 blows of a tup weighing 18 kg. falling from a height of 1.10 meters (39.68 lb. falling 3 ft. 7¼ in.).

5.—*Weld Test:* The pieces welded and quenched should stand the bend test without showing opening or fracture. After the test, the bar being bent 180 deg., the distance apart of the arms should be equal to four times the thickness or diameter of the bar, without showing fracture.

6.—*Interpretation of Results, Retests, Rehandling:* (a) If the results of the test for structure are unsatisfactory two retests shall be made. The lot will be accepted if these two retests are satisfactory. If the contrary, extra discard will be taken from the bars, and four more retests taken. These four retests should be satisfactory for the lot to be accepted. If unsatisfactory the lot will be rejected.

(b) All the requirements of the mechanical tests should be met for the lot to be accepted.

However, if in the series of mechanical tests made from a lot, one piece, at the most, does not meet the conditions, two retests may be made. These retests should be made on the bar from which the defective test pieces came if the contractor so demands, or on two new bars. In the latter case the bar corresponding to the defective test piece will be rejected. The lot will be accepted if the two retests are satisfactory, if not the lot will be rejected.

(c) For the same order the number of lots from which the retests may be taken shall not be greater than one fifth of the total number of lots.

Article 8, Marking of the Products

The products having satisfied the tests shall be marked as follows at one of the ends:

a. The mark characterizing the metal.
b. The mark of the producing plant.
c. The stamp of the inspector.

However, the bundles or packets of bars may receive one mark instead of each bar being marked.

The marks characterizing the metal include:

1. The indication of the specification used for acceptance.
2. A letter corresponding to the method of manufacture:
   - M for Martin process (open-hearth).
   - C for crucible process.
   - E for electric furnace process.
   - B for acid Bessemer process.
   - T for Thomas process (Basic Bessemer).
3. The number corresponding to the minimum tensile required.

For example, a steel marked A—1—U. F. T. 35 (mark of producing plant) (stamp of inspector) means a basic Bessemer steel, minimum tensile strength 35 kg. per sq. mm. (49,780 lb. per sq. in.) and inspected under the specifications translated above.

G. B. W.

Graphic pictures are given in "Safeguarding America Against Fire," issued by the National Board of Fire Underwriters, New York, of the extent of cigar and cigarette smoking. End to end, the cigars smoked in the United States in 1918, 1919 and 1920 would stretch 1,635,435 miles, and the cigarettes 5,184,201 miles, both based on consumption figures of the *Wall Street Journal.* A single day's consumption would reach from New York to San Francisco and back again. Figures for railroad mileage are dwarfed by those for smokes—the total trackage for steam lines being quoted at 368,682, and for electric lines, 48,326 miles.

PUNISHMENT OF RAILS

Mechanical Hardness and Thermal Hardness and Their Causes

In reporting upon the failure in 1919 of a 75-lb. Bessemer steel rail rolled in 1910, Dr. James E. Howard, engineer-physicist Interstate Commerce Commission, Washington, draws attention to the difference, both in origin and in effect, of rail hardness produced by the cold rolling action of wheels and by their slipping. The rail in question showed this analysis:

Carbon	0.46 per cent
Manganese	0.90 per cent
Phosphorus	0.093 per cent
Sulphur	0.046 per cent

Progressive cracks were found, the inception and extension of which led to the final failure of the rail and the derailment of the train. These cracks assumed a pronounced aspect when pickled, which also revealed a slightly shattered condition of the running surface along the middle of the top of the head. The presence of these short crosswise cracks was characteristic of other rails in the vicinity of the place of derailment, which was on a curve.

The cracks were shown to be of thermal origin. There was evidence on the upper surface of the head of exposure to a high temperature, attended with thermal hardening of the metal to a shallow depth, below which the normal structure of the steel prevailed.

Hardness acquired by the heads of rails in service is of two kinds, mechanical hardness and thermal hardness. The running surfaces of all rails are exposed to mechanical hardening, due to the cold rolling action of the wheels. Thermal hardness results from sudden heating, raising a portion of the rail to a high temperature, followed by sudden quenching. No difficulty is experienced in the identification of the two kinds of hardness under the microscope and even a file may be used for the purpose.

Mechanical hardening of rails under current wheel loads is universal. Flattening of the granular structure of the steel occurs in such zones. This type of hardness exhausts the ductility of the steel, embrittling and weakening the rail as a whole, although not attended necessarily with the formation of incipient cracks. At this stage the shape of the grain of the steel may be restored by the process of annealing, and with it the strength and ductility of the rail. Loss in ductility under the cold rolling action of wheel loads represents an intermediate stage in the service of rails, and it may be the precursor of rupture.

The maximum degree or state of mechanical hardness is acquired after the passage of a considerable number of wheels over the rail, different elements along the running surface being subjected in succession to the kneading action of wheels of different contours of treads.

Photo-micrograph of Broken Rail—Magnified 300 Diameters—Showing Incipient Crack in Hardened Metal at Surface of Head

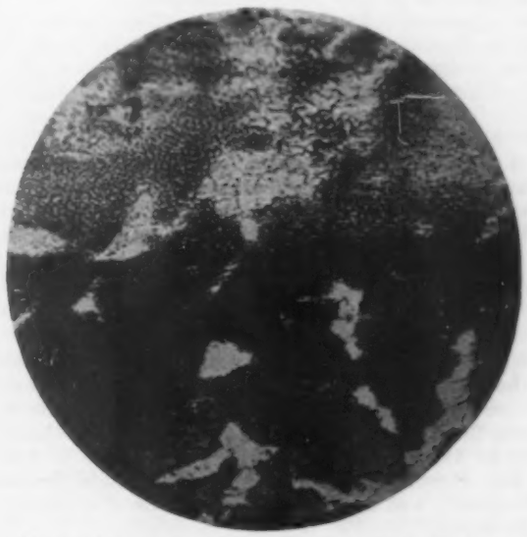


Photo-micrograph of Broken Rail—Magnified 300 Diameters—Showing Junction of the Hardened Zone with Normal Interior Structure

Top of Head of One Section of the Broken Rail—Actual Size—After Pickling, Showing Crosswise Cracks Near Gage Side and Slightly Shattered Metal Along Middle of Head

Result of Wheel Burning

Thermal hardness in the head of the rail results from the slipping of wheels, wheel-burning, so called. This also is a matter of common occurrence in certain

situations, and investigation shows it to be more generally prevalent than the appearance of rails in the track suggests. Thermal hardness may result from the slipping of a single pair of wheels or, as in the case of mechanical hardening, it may result from the action of a number of wheels. Heat effaces thermal hardness, and surface annealing may occur over hardened zones by subsequent moderate heating of the head of the rail. The source of heat in these cases comes from the frictional resistance between the wheel and the rail.

There are points of difference to be considered between mechanical hardness and thermal hardness. In the case of the former, loss in ductility may be partial or complete with respect to the ability of the rail to display ductility under bending stresses; and while ductility may have been destroyed as against bending stresses, residual ductility may still remain, the steel retaining its ability to display further distortion under the kneading action of wheel pressures.

Steel thermally hard is incapable of displaying appreciable ductility under any condition. It is brittle whether under tensile stress or under high wheel pressures. This inability of thermally hard steel to display ductility is sufficient to account for the cracks witnessed on the running surface of the rail which failed. The results of microscopic examination clearly established the fact that the crosswise cracks in the head of the rail were in steel which had been thermally hardened.

The evidence presented by this rail raises two leading questions; one pertaining to the conditions which caused the hardening of the metal, the other having to do with the manner of development of the series of surface cracks. Thermal hardening of rails in service results from the slipping of wheels, and from that cause only. Driving wheels may slip in the starting of trains and all wheels may slip when brakes are applied in stopping a train or in retarding its speed. Further, the difference in length between the outer and inner rails of a curve requires the wheels on either the high or the low rail to slip.

The individual action or the combined action of these two features—slipping by accelerating or retarding forces, and slipping by reason of the difference in length of the high and low rails of a curve—must account for the heating of this rail. The effect of curvature of the track would seem a negligible factor, and ordinarily be omitted from consideration, as well as differences in the tape size of mated wheels, nevertheless minute cracks visible on other rails in the vicinity of the place of derailment were on curved track and very sparingly shown on tangents.

In respect to the manner of development of these surface cracks, the tractive force of the driving wheels of the engine tends to force a film of surface metal in a backward direction. The resistance of the car wheels is in the opposite direction and forces the metal forward. Under braking conditions the drift of all wheels is forward. These movements alternate on a single-track road.

Cost of Living Still Falling

Reports of the Bureau of Labor Statistics show that the price decline, which started nearly a year ago, continued unabated through April. Metals and metal products fell from 139 in March to 138 in April (based on 100 as average value in 1913); this group is still, with one exception, the lowest of all. These figures are wholesale and represent in each case the average for the month.

Index Numbers by Groups of Commodities
(1913 equals 100)

	April, 1920	March, 1921	April, 1921	A*
Farm products	246	125	115	89.7
Food, etc.	270	150	141	75.9
Cloths and clothing	353	192	186	66.0
Fuel and lighting	213	207	199	12.4
Metals and metal products	195	139	138	60.0
Building materials	341	208	203	57.3
Chemicals and drugs	212	171	168	39.3
House-furnishing goods	331	275	274	24.7
Miscellaneous	238	167	154	60.9
All commodities	265	162	154	67.3
RETAIL FOOD	211	156	152	53.2

*A represents the percentage drop, in one year, of the excess of April, 1920, over the average for 1913.

Retail costs announced by the National Industrial Conference Board are based on a somewhat different lineup of items. They record a peak in July, 1920, at 104.5 per cent above the cost for July, 1914. Rents have advanced steadily since that time; fuel and light have not lost all of their late advance; all other items have fallen, month by month. The figure of 165.7 for May 1 is slightly above the wholesale figure of 162 reported by the Bureau of Labor Statistics—for the items differ, and retail liquidation in many commodities is lagging well behind wholesale readjustments. The figures follow:

	July, 1914	July, 1920	Nov., 1920	March, 1921	May 1, 1921
Food	100	219	193	156	152
Shelter	100	158	166	171	171
Clothing	100	266	226	174	168
Fuel and light	100	166	200	187	178
Sundries	100	185	193	185	185
Total	100	204.5	193	168.7	165.7

Why the Eight-Hour Shift Was Adopted

Explaining the action of the Youngstown Sheet & Tube Co., Youngstown, Ohio, in adopting the universal 8-hr. day, President James A. Campbell states:

When we reduced wages early in February we expected that by this time business would have improved so that we could operate our plant without any change in the hours. When we found during the month of April that business did not improve, but, if anything, grew worse, we decided that we should not be paying part of our men overtime while the others were walking the streets without employment. Therefore, we decided to put all departments on 8-hr. basis: first, because it would more evenly divide up the work among our employees; and, second, because it would reduce our labor costs to some extent by making it unnecessary to pay time and a half for over eight hours. We lost money in March and April, and for this reason it was necessary for us to operate as economically as possible. This is only a temporary arrangement, and as soon as business will justify it or we have business enough to operate our plant on the old basis of hours, we expect to go back to that arrangement.

New Electrically Welded Chain

A new kind of electrically welded chain, in which the flash, or swell, appears upon the inside of the oval link, rather than upon the entire circumference, is being made by the Columbus McKinnon Chain Co., Columbus, Ohio. Some manufacturers of electric weld chain leave this swell because of the added strength, while others grind or shear it away to make it smooth at the welded joint. The Columbus McKinnon chain, known as the "Inswell," retains all the flash, but the material is forced to the inside of the link. The manufacturer claims that the welded joint is 25 per cent stronger than any other portion of the link.

The uniting of the engineering societies of North and South America seems to be under consideration. The question seems to be in the hands of a special committee on foreign relations of the American Engineering Council of the Federated American Engineering Societies, a committee which grew out of a Russian committee of engineering societies. L. B. Stilwell, a consulting electrical engineer of New York, is head of the committee. It appears that the movement for uniting the societies was started by Franklin Adams, counselor for the Pan-American Union, Washington. The foreign relations committee incidentally, as already stated in these columns, is preparing to visit England this summer to present the John Fritz Medal to Sir Robert Hadfield.

The Canton Cutlery Co., Canton, Ohio, has increased its capitalization from $50,000 to $200,000 to absorb its surplus and take care of increased business. The company makes pocket knives of an alloy steel of vanadium content, known as "Car Van" steel, developed by Dr. W. Stuart Carnes, president of the company. It claims to be the only manufacturer of pocket knives in the United States using an alloy steel, made especially for pocket knife blades and other cutlery specialties.

Taylor Society Meets at Cleveland

Development of Yard Stick to Measure Performance of Employees—Study of Unemployment and Its Elimination—Barometers of Production

DEVOTED to the promotion of scientific management, the Taylor Society held its spring meeting at the Hotel Statler, Cleveland, May 19 to 21, with a registration of about 350, including a fair representation from the metal working lines. While various phases of the subject of scientific management were discussed, particular attention was given to the garment industry, and the second day was spent at the new plant of the Joseph & Feiss Co., where, after visiting the plant during the morning, a plant managers' session was held during the afternoon, this session being devoted to an intensive study of a scientific management plan used in this plant. Richard A. Feiss, of the Joseph & Feiss Co., is vice-president of the Taylor Society.

Five general topics were taken up in the various sessions. Papers were presented on the different topics and these were followed by ten-minute discussions by assigned speakers and then by general discussions from the floor. The sessions and speakers who led the discussions with paper were as follows:

Five Sessions with Separate Topics

Sales Executive Session, W. C. Dunlap, vice-president American Multigraph Co., Cleveland, presiding; Method of Compensation for Salesmen, C. K. Woodbridge, sales manager Dictaphone Columbia Graphophone Co., New York; discussion led by Chas. J. Crockett, sales manager American Lady Corset Co., Detroit, and Harry R. Tosdal, assistant professor of marketing, Harvard Graduate School of Business Administration.

Administrative Officers' Session: The Value of an Index Number of Physical Production to Administrator and Manager, by Carl Snyder, statistician Federal Reserve Bank, New York; discussion led by Dr. Leonard Ayes, vice-president Cleveland Trust Co., and E. W. Hulet, vice-president and factory manager of the White Motor Co., Cleveland.

Plant Managers' Session: H. S. Parson, managing director Taylor Society, presiding; discussion based on observations at clothcraft shops, opened by William O. Lichtner, the Thompson & Lichtner Co., Boston, and A. R. Rich, assistant manager of works Dennison Mfg. Co., Framingham, Mass.

Personnel Administration Session, Morris A. Black, president H. Black Co., Cleveland, presiding: Performance Rating and Bonus for Salaried Employees, by Howard G. Benedict, consulting management engineer, Cleveland; Unemployment Scores, by Morris L. Cooke, consulting management engineer, Philadelphia.

Industrial Relations Session, William G. Lee, grand chief Brotherhood of Railway Trainmen, Cleveland, presiding: Symposium: Joint Action of Employees and Management in Establishing Standards, Tasks, Rates, and Other Standard Conditions: John M. Carmody, production manager H. Black Co., Cleveland; Meyer Perlstein, vice-president International Ladies' Garment Makers Union and William R. Basset, Miller, Franklin, Basset & Co., New York.

Address of Welcome Decries Legislative Meddling

As President Henry S. Dennison, Dennison Mfg. Co., Framingham, Mass., was unable to be present, Vice-President Richard A. Feiss presided at the opening session. An address of welcome was made by Alexander C. Brown, president Cleveland Chamber of Commerce and Brown Hoisting Machinery Co. Mr. Brown said that the Taylor Society had a great opportunity in the present economic situation for rendering real public service. The national problems at present are so great that only through such organizations as the Taylor Society can the surface of the existing problems be pricked. He enumerated the various existing problems such as business depression, unemployment, etc., and said that one of the great dangers of the situation is that the Government may attempt to settle too many of these problems. He declared that what is wanted is not more legislation but more information. A function of the Taylor Society is to focus its attention on many of these problems and do what it can to solve them without the necessity of legislation. Unemployment he cited as one of the greatest problems, and he regretted that more attention has not been given to the collection of information on this subject.

Personnel Administration—Salaried Employees

One of the most interesting sessions from the standpoint of the metalworking industry was that on personnel administration. The first speaker at this session, Howard G. Benedict, in discussing performance rating and bonuses for salaried employees, said that in the matter of salary adjustments managers have often felt the need of a yard stick to measure and value salaried employees, in place of valuation on the basis of general impressions. Too frequently one has no definite reason for granting or withholding an increase. If an increase is refused the reason should be pointed out and if an increase is granted, those who do not receive increases should have the reasons for a particular increase made clear. Fair and just appraisal and fair and just unsolicited rewards are a part of the process of building men, which is an essential part of management. If the waste of undeserved salary increases is eliminated, the cost of deserved increases may be met.

The speaker said that for years standard practice has been used for practically every detail in a factory, and that managers should know with what measure of interest, accuracy and co-operation these are carried out, and reward accordingly. For years there have been set standards of detailed performance for workers who have been rewarded accordingly. The work of superintendents, department heads and foremen should now be given attention. There is the practice of rating some of the latter with respect to performance on a particular job, but what is needed to get at net worth is also a rating as to general characteristics. There will always be differences of opinion in an organization, but when certain policies and plans of action are decided upon the various divergent views should be subordinated to making the plan a success along the lines of the policy adopted.

Mr. Benedict said that many years ago, he became dissatisfied with the method when selecting men for responsibilities and sought some basis of fact for selection and promotion. He began by putting in the files a memorandum when anyone made a particularly glaring error. This was a helpful beginning, but realizing that a blacklist is an unsatisfactory measure he later began to dictate memoranda to foremen and others about what he had observed during daily inspection trips, including complimentary items as well as the other kind. Files of these memoranda became a basis for judging men, as they included records of good as well as unsatisfactory performance.

Co-operation Rewarded in Compensation

Later he put into effect a plan of rating men and setting a money value on co-operation. This brought about a marked change in a plant where there was lack of co-operation. In the rating system, as established, each salaried employee is periodically rated by a rating committee with respect to the following quali-

ties: Attitude and co-operation, reliability, ability, action, leadership and personality. In rating each quality definite elements are considered which go to make up the quality. For example reliability is made up of five positive elements—honesty, truthfulness, dependability, straightforwardness and sincerity, and a like number of negative elements.

The mechanism for carrying out such a rating system consists of inter-departmental memoranda in triplicate pads. A memo is made out for each instance of inefficiency, error, etc., and one copy is given to the employee affected, one retained by the man issuing it and one sent to the rating committee. While such a rating system may be started by the plan of having only a restricted number of higher executives issue these memoranda, he had found that the system will unavoidably develop so that all executives and sub-executives affected by the system will be drawn into the plan. The rating committee will vary with the type of organization and may consist of major executives, or a combination of major and sub-executives, or other combinations. After a periodical rating is made, each person affected is called in individually and the rating is discussed with him. When ratings are finally closed, bulletins are sent to each person rated, so that he may know his relative standing. It is not necessary to have bonuses attached to the ratings, as comparative standings have a salutary effect.

Establishment of Standards a Pre-Requisite

The speaker said that there are certain prime requisites to a successful plan of performance ratings. Before rating is begun there must be established clearly definite standards of detailed duties and responsibilities. The memoranda which form the basis of rating must be operated jointly by every one concerned. Employees must not feel that they are tale bearing or concerned with anything but the welfare of the business. They should feel that co-operation is a quality that should be most highly rated. The employees must be "sold" to the plan as a permanent and substantial feature of the business. The management must assume maximum responsibility in establishing, publishing and maintaining standards.

In conclusion, he said: "The idea I want to put across, and as strongly as possible, is that we should adopt some means of measurement of salaried employees, that it should be based on the evaluation of definite elemental qualities, that its operating should be open and above board, and that, to be successful as an incentive, it should be accompanied by both moral and financial rewards for high degree of performance."

Unemployment Within Employment

Morris L. Cooke, in a paper delivered during the personnel administration session, on unemployment scores, presented an argument for the adoption of definite standards of measurement for the phenomena included under "unemployment within employment," that is, unemployment of workers who are on the payroll, but do not have enough work come through to give them full-time income-producing work. He said that the maximum relief from the evils attendant upon unemployment will come about through a localization of the problem in the individual plant.

All idleness through pre-determined hours of work is waste—an enormous waste in the aggregate. An unemployment score is the best all round test of effectiveness of the management. The test of employment and of efficient management is not the being on somebody's payroll. The test is the percentage by which the amount of time actually occupied in production work falls short of the possible maximum, based on a pre-determined proper length of working day.

The speaker said that the matter of unemployment within employment demands serious study, and a mechanism is needed for rating the performance of individual plants and evaluating the results achieved in different industries and communities not providing steady work. An unemployment score should include not only the gross measure of unemployment, but also a measurement of contributing causes. He presented a chart showing five main contributing causes for unemployment, each of these having various subdivisions. The five causes include orders—inadequate volume, uneven flow, etc.; lack of materials; absenteeism; equipment, such as breakdowns, etc., and factory administration, including strikes, lockouts, etc.

Standardization to Follow Careful Study

Mr. Cooke stated that, until there is a generally recognized method of taking unemployment scores, each employer will have to make for himself certain assumptions and adopt tentative rules; but a little experimentation in any well-run plant will make available for this purpose data now being regularly collected. He believed that we now have arrived at the time when the manufacturers who are to be the most prosperous in the long run will definitely decide on the size of force required, and hold to it. In almost every case this will mean a force smaller than that now employed.

Matters brought out in the papers presented by Mr. Benedict and Mr. Cooke led to considerable interesting discussion. Joseph A. Carlin, Conshohocken, Pa., said that a valuable feature in Mr. Cooke's proposed unemployment score is that such a score would point out weaknesses in an organization. He would carry the matter a little further and by a system of time cards would charge each department for the idle time for which that department is responsible. He would also have a system of idle time cards for keeping a record of men on a company's payroll, but temporarily out of work.

Rating of Salaried Employees Sometimes Hazardous

One speaker raised an objection to Mr. Benedict's plan of rating salaried employees, saying that men may not have an opportunity to show their qualifications, employees seeing the ratings would think them all wrong. He doubted whether an employee's abilities would be measured by such a plan. He would rather leave the matter to a capable manager or superintendent.

Attention was called to the fact that a similar system was employed in rating officers during the war. While this proved satisfactory, it was stated that the army experience showed that, for the plan to work successfully, the manager or someone responsible for a man's work should be the judge of his qualifications. Otherwise personal likes or dislikes might have some influence in passing judgment. One speaker said that he met with several other executives of his company to try to adopt a plan of rating, but they could not reach an agreement on the relative importance of various qualifications.

Compensations of Salesmen

W. C. Dunlap, in opening the Sales Executive Session, said that it is hard to get at real fundamentals in compensation that would apply to all industries. C. K. Woodbridge, in a paper on Methods of Compensating Salesmen, outlined various plans, and said that no one has yet discovered a good sales compensation plan that will fit all types of business. Charles J. Crockett, in discussing the same subject, said that it is a good plan for manufacturers to divide their lines into three parts, low, medium and high-grade, paying a certain commission on the medium, less on the low grade and more on the high grade. In his opinion, one of the greatest drawbacks in salesmanship is the unscientific way in which sales territory is allotted. These territories are often so large that the salesman does not have the time to sell the institution he represents.

Index Numbers for Physical Production

A great deal of interest was taken in the discussion of the value to administrator and manager of an index number of physical production. Carl Snyder, in dealing with this subject in a paper entitled "Barometers of Production," and with charts, showed that by ironing out the fluctuations over about a three-year period the curve of production has been moving upward at a very uniform rate for the past fifty years, the most marked fluctuations being in steel, and concluded that this rate of increase, after being fairly steady for a half century, is not going to change very rapidly now.

He said that our present under-production is much

(*Continued on page* 1428)

New Line of Industrial Trucks

A new line of storage battery trucks and tractors in which various parts are interchangeable has been brought out by the Atlas Car & Mfg. Co., Cleveland. The interchangeable units include driving, steering, control and trailing.

The tractor shown in the accompanying illustration is 84 in. long over all, 40 in. wide, and has an outside turning radius of 75 in. A two-step coupler provides coupling heights of 19 in. to 22 in. above the floor. The tractor will turn in intersecting aisles 5 ft. wide. It has a 4-wheel steer, the steering handle being hinged to allow easy access to the seat. It is furnished with either two or four-wheel drive. The drive is from a flexibly coupled wheel type motor to a single reduction worm and gear, the latter being entirely enclosed and immersed in an oil bath. The universal joints are provided with grease-tight covers. Ball bearings are used throughout.

Pedestals similar to those used in locomotive practice are provided for the axles, and heavy coil springs carry the frame and battery. The brakes are of the external contracting shoe type. One of the brakes is interlocked with the controller safety switch so that when the operator releases pressure on the foot pedal the brake is applied and before it can be released the

Storage Battery Industrial Truck and Tractor. The drive is from a flexibly coupled wheel type motor to a single reduction worm and gear

controller handle must be brought into neutral. The controller is of the drum type, entirely enclosed, and has three speeds in either direction, the first being only through resistance. Other features include a locking type of differential and drop forged brake levers and steering yokes.

The battery equipment consists of 42 cells of Edison, or 24 cells of lead battery. The drive speed on a hard floor without load is 6 miles per hour.

The line will include elevating platform trucks, low platform and warehouse type of trucks, with or without electric cranes, and high platform trucks with various types of bodies.

Orders for Canadian Steel Rails

The Canadian Government stands ready, says *Iron and Steel of Canada*, to place an order for 50,000 tons of steel rails with the Dominion Iron & Steel Co. if this company will quote a price which will meet American competition. This is similar to the order recenty placed with the Algoma Steel Corporation for the Canadian National Railways.

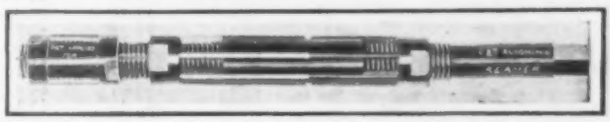
The K-W Brick Co. has been formed at Youngstown, Ohio, to manufacture pressed bricks out of pulverized slag and a combination of certain chemicals. Other products will be tiling, coping, curbing and building blocks. Patents covering the production and formulæ have been obtained. The company's capital is $150,000. J. W. Whittaker of Warren, master mechanic of the Trumbull Steel Co., is president; Francis J. Kramer, Niles, is vice-president and George B. Dilley, Youngstown, is secretary and treasurer.

Improvement in Fabricated Steel

The amount of fabricated steel business that was contracted for in April, according to the records of the Bridge Builders and Structural Society was 55,800 tons, corresponding to 31 per cent of the capactiy of the bridge and structural shops of the country. This compares with 52,300 tons for March. The March total in turn was the best monthly record since September, 1920. The first four months of 1921 make a total of 165,700 tons, which is practically 40 per cent more than in the first four months of 1919, when the effect of the signing of the armistice was felt and when the total was 119 700 tons.

Aligning Reamer

A new type Critchley aligning reamer has been brought out by Chadwick & Trefethen, Portsmouth,

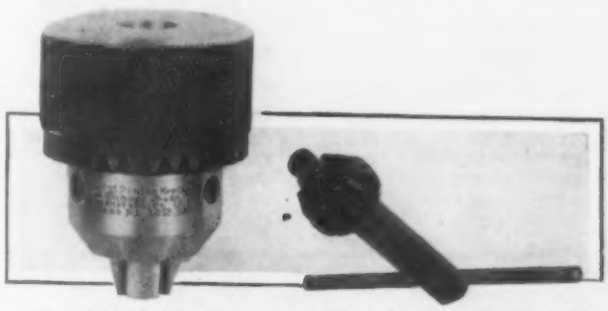


Aligning Reamer for Automobile Piston Pins and Similar Work

N. H. They embrace the general principal of their six blade adjustable reamer, with an adjustable bushing that forms a pilot for aligning. The back parts of the blade are ground cylindrical, also forming an adjustable guide after the cutting blade has passed through the first hole, retaining the reamer in line for the second hole. Cutting parts are made of special alloy semi-high speed steel. This design is adaptable to the reaming of automobile piston pins and work of similar character.

Pinion Geared Drill Chuck

The Skinner Chuck Co., New Britain, Conn., has placed on the market a new pinion geared three-jaw drill chuck, which is a departure from its previous designs in that the gearing is exposed on the nut whereas in other models it is enclosed. For the present it will be made in the one size having a capacity of 0 to 17/32-in. Its outside diameter is 2 5/16-in., the length of the body is 2 7/16-in., and the total length with the



Pinion Geared, Three-Jaw Drill Chuck Recently Brought Out

jaws extended, 3 5/16-in. Other sizes will be added later.

Like previous models the chuck is designed with a view to strong grip, accuracy and endurance. It is hand operated except for the final grip on the drill and operates freely and smoothly without backlash. The jaws are milled, ground and threaded in a manner to insure proper angles and when assembled rest in milled V-slots. The threaded ring that operates the jaws is solid.

A bill which has been approved by President Harding grants the Trumbull Steel Co., Warren, Ohio, the right to build a bridge across the Mahoning River at Warren in connection with erection of its new 600-ton blast furnace, now virtually completed. The action was necessary inasmuch as the Mahoning is classed as a navigable waterway.

BRASSES CONTAINING NICKEL

Results of a French Research on Some New Alloys

A paper by Dr. L. Guillet, in the *Revue de Metallurgie*, July, 1920, gives an account of his new work on brasses containing nickel. It is a continuation and enlargement of work carried to partial completion before the war, but entirely stopped during the war period. The alloys were made in crucibles using pure copper and commercially pure nickel in small cylinders. The analyses of the 15 alloys are as follows:

Series	No.	Copper Per Cent	Nickel Per Cent	Zinc Per Cent
A, 50 per cent copper..	1	50.32	4.15	44.70
	2	50.34	6.70	42.12
B, 45 per cent copper..	3	45.32	8.34	46.19
	4	46.35	10.35	43.16
	5	46.03	12.56	41.07
C, 40 per cent copper..	6	40.25	12.87	46.52
	7	40.46	14.42	44.65
	8	41.10	16.54	41.83
D, 35 per cent copper..	9	36.15	17.70	45.77
	10	36.18	19.58	43.78
	11	36.26	21.82	41.40
	12	35.86	23.49	40.15
E, 30 per cent copper..	13	30.57	22.70	45.80
F, 25 per cent copper..	14	25.01	24.81	48.70
	15	25.74	27.76	45.84

The color of such alloys is important. Nos. 1 and 2 were a pale gold; No. 3, a yellowish white; Nos. 4 and 5, white with a yellowish reflection, and from Nos. 6 to 15, a silver white. Careful observations were made as to the possibility of rolling or forging hot by taking ingots 80 mm. diameter, heating and rolling under the same conditions as for brass, heating 650 to 750 deg. C., and rolling with the same speed and reduction and the usual methods to around 20 mm. (0.787 in.) diameter. Under these conditions alloys Nos. 1 and 2 rolled very easily and showed no defects. Alloy No. 3 rolled with difficulty and showed cracks. Alloy No. 4 rolled readily and showed no defects. Alloys Nos. 5 and 6 rolled with difficulty, but showed no defect. Alloy No. 7 rolled easily and without defects. Alloy No. 8 after rolling showed incipient cracks. Alloy No. 9 showed cracks from the beginning. Alloys Nos. 10 to 15 inclusive fell to pieces from the beginning.

The results of mechanical tests are shown in the table for bars cast in sand and for rolled material, the latter after annealing at 700 to 725 deg. C. The more interesting results are shown in large type or full face. The alloys with less than 50 per cent copper have been patented by the Societe Metallurgique de La Bonneville.

The tensile tests were carried out on the usual size tests pieces 13.8 mm. diameter and 100 mm. between punch marks (0.543 in. diameter, 3.94 in. between punch marks). The shock tests on bars 10 x 10 mm. with a notch 2 x 2 m.m. rounded at the bottom (0.394 in. x 0.394 in. with notch 0.079 in. x 0.079 in.). The resilience is given in the French results, probably kilogram-meters per sq. mm. The Brinell test was the usual one, 3000 kg. pressure and a 10-mm. ball.

The most remarkable alloy in view of the mechanical tests is No. 4, with 46.3 per cent copper and 10.3 per cent nickel. However, it shows yellowish reflections which prevents it being employed for certain uses.

Some experiments were made on cold-drawing of alloys Nos. 1, 2 and 4. They worked harder than brass, due to higher elastic limits. In the paper physical results are given after drawing the rolled bars from 20 to 18 mm. diameter.

In order to investigate the influence of lead on the machining properties four alloys were prepared of the following composition:

Copper Per Cent	Nickel Per Cent	Zinc Per Cent	Lead Per Cent
45.25	10.26	43.28	1.04
45.33	10.38	41.98	2.04
45.48	10.48	40.58	3.06
45.15	10.43	40.10	4.02

Under the microscope the lead was found in globules, more numerous as the percentage of lead increased. Full details are given of the mechanical tests of these alloys as cast and rolled. The lead is not really harmful until it exceeds 3 per cent, and the results show that the addition of 2 to 3 per cent does not greatly decrease the properties of the rolled bars. In general the nickel brasses machine easily but less so than ordinary brasses. The presence of lead helps the machining but does not render them so easy to machine as the usual brass. For the same percentage of copper, lead helps machining very materially and the chips are short and separate easily from the tool.

The paper also gives many photomicrographs of the various alloys, and discusses fully the structures found.

G. B. W.

				Tensile Test				Shock Tests		
No.	Copper, Per Cent	Nickel, Per Cent	Condition	Elastic Limit, Lb. Per Sq. In.	Ultimate Strength, Lb. Per Sq. In.	Elongation, Per Cent	Red. of Area, Per Cent	Resilience	Breaking Angle	Brinell Test
1	50.3	4.1	Cast	28,450	52,480	9.0	14.2	5.6	167	143
1	50.3	4.1	Rolled	29,870	62,580	9.0	49.7	9.5	149	151
2	50.3	6.7	Cast	31,280	62,860	31.0	44.3	7.5	149	109
2	50.3	6.7	Rolled	25,030	71,970	46.5	14.2	11.3	144	118
3	45.3	8.3	Cast	27,310	28,160	0.5	1.4	1.8	180	160
3	45.3	8.3	Rolled	35,990	49,780	3.0	3.1	2.5	180	156
4	46.3	10.3	Cast	26,880	68,700	31.0	30.7	11.0	151	128
4	46.3	10.3	Rolled	36,690	80,500	45.0	57.5	13.2	142	137
5	46.0	12.5	Cast	34,130	53,050	17.0	11.5	9.7	146	121
5	46.0	12.5	Rolled	32,710	67,130	49.0	52.7	13.7	135	116
6	40.2	12.8	Cast	.....	6,970	1.0	....	....	...	159
6	40.2	12.8	Rolled	40,110	43,240	1.0	1.4	1.5	180	170
7	40.4	14.4	Cast	56,890	91,740	7.0	10.1	4.3	168	190
7	40.4	14.4	Rolled	44,520	86,470	18.5	19.4	7.8	168	170
8	41.1	16.5	Cast	81,070	92,450	....	....	2.5	179	255
9	36.1	17.7	Cast	54.900	72,250	2.5	4.5	3.0	173	191
9	36.1	17.7	Rolled	51,200	77,230	5.5	7.3	5.0	178	187
10	36.1	19.5	Cast	71,110	90,030	2.0	3.1	3.1	178	217
11	36.2	21.8	Cast	87,610	87,610	1.0	....	2.5	179	221
12	35.8	23.5	Cast	93,580	93,580	1.0	0	2.1	177	262
13	30.5	22.7	Cast	21,190	35,410	0	0	1.2	179	210
14	25.0	24.8	Cast	Too fragile to machine.						
15	25.7	27.7	Cast	8,530	8,530	0	0	1.2	179	228

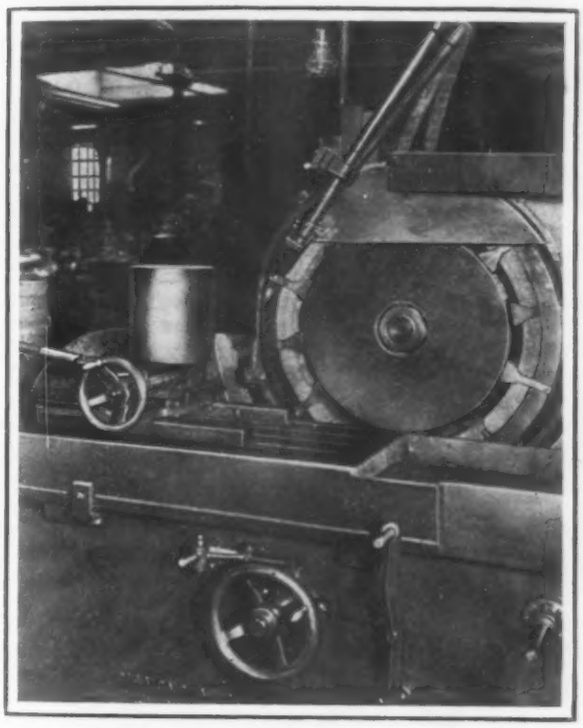
George L. Morehead, manager, Link-Belt Co., Indianapolis, presented the paper at the regular monthly meeting of the Engineers' Society of Western Pennsylvania, at the William Penn Hotel, Pittsburgh, Tuesday evening, May 17. Mr. Morehead's subject was "Description of the Manufacture of Elevating, Conveying and Power Transmission Chains."

The Associated Building Contractors of Evansville, Ind., began operating, May 1, on the open shop plan with all building crafts except carpenters, bricklayers and sheet metal workers, who have signed contracts to work on a reduced wage scale.

Sectional Wheel Chuck for Face Grinding

The accompanying illustration shows a sectional wheel chuck recently placed on the market by the Diamond Machine Co., Providence, R. I., for use in production work on Diamond heavy duty face grinding machines. The advantage claimed for the sectional wheels is that their cost is less than half that of ring wheels, with equal efficiency.

Instead of a solid ring of abrasive material there is a sectional wheel made up of 12 segments. Each segment is held in place by two wedges, each alternate wedge being fastened and the other movable. The blocks are tightened in place by means of square head set screws countersunk in the periphery of the chuck. The same means for setting out the blocks is employed as in the case of the solid wheel, namely, a cast steel backing plate which may be drawn forward by set screws.



Sectional Wheel Chuck Developed for Use on Heavy Duty Face Grinding Machine. Each segment is held in place by two wedges, one of which is fastened and one movable

The life of the segments has been found to be approximately the same as that of the ring wheels. No undue spawling or breaking down of the corners is observed. In work having a wide area the use of the sectional wheel tends to diminish the area of contact. It is also said that the openings between the segments permit freer cutting and cooler grinding, thus diminishing possible heating or warping of the work in case the feed is crowded. The basis of this claim seems to be that the openings between the blocks permit an easy access of lubricant between wheel and work.

Sectional chucks will be standard equipment for new machines but may also be furnished for machines now in service.

Steel Employment Falling

WASHINGTON, May 19.—Of 14 industries surveyed, the greatest percentage of decrease in payroll in April as compared with March was made by the steel industry, according to the Bureau of Labor Statistics. For the two-weeks period in 112 establishments the total pay in April was $6,384,265, as compared with $8,016,149 in March, a drop of 20.4 per cent. The number on the payroll in April was 119,165, as compared with 131,965 in March, a decrease of 9.7 per cent. Average pay dropped from $60.74 to $53.57, a loss of 11.8 per cent.

A decline of 53.8 per cent was shown in the payroll in April, 1921, compared with April, 1920; while the number of employees in 113 establishments fell from 189,170 to 120,641, a decrease of 36.2 per cent.

Figures of the Bureau show that in eight industries there was an increase in the number of persons on the payroll in April of this year as compared with March, and in six a decrease. The largest increases are 25.5 per cent in automobiles and 22.3 per cent in woolen. Respective decreases of 12.3 per cent, 11.4 per cent and 11.3 per cent appear in car building and repairing, paper making and the leather industry.

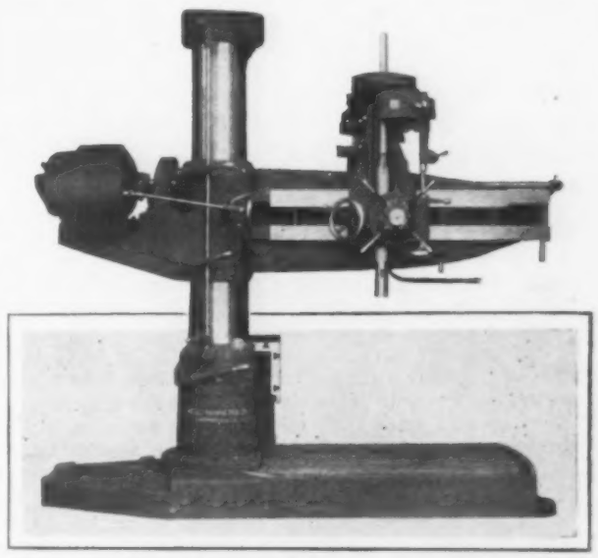
Commenting on changes in wage rates and per capita earnings as they relate to the steel industry, the Bureau says:

"Four plants reported a decrease of 20 per cent, affecting all men in three plants and 95 per cent of the men in the fourth. In one concern, all 10-hour men were reduced 20 per cent in wages, while all 8-hour men were reduced 15 per cent. In another concern the wages of all employees were decreased: one-half of the force being decreased 19 per cent, one-fourth of the force, 19.2 per cent, and the remaining fourth, 11½ per cent. A reduction of 18 per cent was made to all employees in one concern. Two mills reported a wage rate decrease of 13 per cent, affecting all employees in the first mill and 3 per cent of the employees in the second. A decrease of 10 per cent to 46 per cent of the force was reported by one plant. All employees in another plant were reduced 60 cents per day. Irregular operation, caused by lack of orders and general business depression, was reported throughout the industry."

Simplified Motor Drive for Radial Drill

A simplified design of motor drive mounted on the arm of a radial drill, as shown in the accompanying illustration, has been recently developed by the Dreses Machine Tool Co., Cincinnati.

The pinion on the motor meshes directly with a large gear on the horizontal back shaft of the arm, an arrangement which eliminates two pairs of bevel gears, three spur gears, eight bearings and two long and one short shaft in the driving mechanism. This simplification is said to permit the using of a motor of one-third less capacity than if placed at the base of the drill.



Simplified Motor Drive Mounted on Arm of Radial Drill. Motor pinion meshes directly with large gear on the horizontal backshaft of the arm

The controller is placed in front of the motor and the controlling handwheel brought within easy reach of the operator by means of a universal joint, shaft and bracket. The hand wheel rim is beveled and marked to show the spindle revolutions at the different stations of the controller. A fixed pointer reaching over the hand wheel serves as an indicator. This arrangement eliminates several parts that are necessary when the controller is placed in the rear of the motor and arm.

The motor is placed on a sub-base so that any make may be used without making a change in the arm.

Supply Men Expect Trade Recovery in Fall

Confidence in the Future the Keynote of Triple Convention Held at Atlantic City—Belief is Held That Worst of the Business Depression Has Passed

CONFIDENCE in the future was the keynote of the meetings of the supply associations at Atlantic City, N. J., last week. These three organizations, the American Supply and Machinery Manufacturers' Association, the National Supply and Machinery Dealers' Association and the Southern Supply and Machinery Dealers' Association, met jointly as has been their custom for years. Most of those who discussed business conditions at the various sessions placed the time for the buiness recovery in the fall of this year. There was unanimity of opinion that the worst phases of the depression have passed. Manufacturers and jobbers are still carrying very large stocks, but the jobbers have been liquidating gradually and anticipate a gradual recovery from this time on in the volume of their sales.

President Beaver's Address

The American Supply and Machinery Manufacturers' Association opened its convention Monday morning at the Marlborough-Blenheim Hotel with reports of officers and committees.

President Charles W. Beaver, in his opening address, spoke in part as follows:

"The unexpected makes life real. If everything should turn out according to plan, the world would soon become a very dull place. The thing which makes life worth living is the competition which is going on daily between intellects, personalities, and even in nature itself. A year ago we were riding on the crest of the wave, to-day we are at the bottom of the hollow.

"A year ago our country was in the gravest danger, the danger of unprecedented business wealth. To-day, thanks to no good judgment on our part, we are orienting our economic position through sheer necessity brought about by the reaction throughout the world to this commercial over-fattening process on the part of our country. We are fast reaching a point where we can enter the race, lean and lithe, and efficient to run the race of competition.

"It matters not whether your business dealings are bounded by a radius of fifty miles or whether they reach to the uttermost corners of the earth, you must be vitally interested in what people are doing in Europe or the Far East just as much as you are interested in what people are doing in your home town.

"If you or I have it made so easy for us to do business or live that it simply becomes a monotonous system we are not going to remain worth while for very long.

"Men who make their mark usually have had to rise through sheer force of character over almost unsurmountable obstacles. By the same token our country to-day is in danger because many of the nations of the world are burdened with adversities which we do not have. This stimulus is going to make Europe come back. It is going to develop the newer portions of the world. It is going to make a formidable nation out of Japan.

An Added Liability.

"Now that we recognize our great wealth and vast resources more in the nature of an added liability, rather than an asset; as a handicap in the world race, we can put forth genuine effort, and, if we will, keep our lead in the forefront of the march of progress. We must realize that we cannot possibly succeed and progress unless the rest of the world is with us. We cannot go off by ourselves in a corner and succeed through selfish isolation. We must give and receive. We cannot pile up treasures like Babylon of old, nor levy tribute like Rome, without someday paying the debt just as surely as Babylon and Rome paid. It has been said that the United States, in one way or another will, during the next fifty years, pay most of the cost of the European war. This is not impossible. It invariably follows that any great debt of this character is paid by the development of untouched resources.

"Before the war we were rather a provincial nation, developing our wonderful natural resources, increasing our industrial life behind a tariff wall, and year by year adding to our wealth in agriculture. In this process we have reached the point where we must find a foreign market for approximately one-fifth of all we produce in this country. If we cannot do this, stagnation and deterioration are inevitably sure to set in. Why is every dollar's worth of export business equally important to every man, woman and child in the United States of America? I remind you of "the house that Jack built." It may be the Kansas farmer who raises the stock that provides the meat which feeds the mechanic who makes the generator which supplies the energy that lights the streets of Tokyo.

Importance of Economies.

"During the past few years it has been so easy for us to get business in overwhelming volume that we have forgotten how to practice economies and have allowed our producing and distributing costs to rise beyond reason. We have been on a truly artificial basis for the past several years. We cannot sit back and expepct the situation to remedy itself. Just so soon as each individual puts his own house in order will the economic situation enable American business to take its place in cooperative competition unhampered by the standard of false values which has become more or less of a habit with us. We have got to a point where it is necessary for us to make good on our promises one hundred per cent. Carelessness in promises or carelessness in service has been tolerated during the fat years. The time is now here when false standards of this character must be ruthlessly cut away.

"It is not going to help us as a nation if our economic independence encourages us to place a wall around ourselves, and, like the hibernating bear, live off of our accumulated fat while the winter of adversity rages around us.

We Must Expect a Closer Profit Margin

"We must learn to do business on a closer margin of profit, such as the European industries have for many years been content to receive. We must learn that the word service implies more than the performance of a duty for profit. It must imply a partnership with the rest of the world in stablizing economic inter-dependence. It means putting some of our dollars to work in the far corners of the earth to exploit and develop natural resources for the benefit of our children and their children. It means that we shall not be content with our own little circle of intimate friends and the profit of our immediate community, but that we must concern ourselves, or, at least, teach our children to concern themselves with the wheat crop in Argentina, the wool clip in Australia, the labor situation in Osaka, the fiscal policy of Whitehall, or the educational projects in Bangkok just as readily as we familiarize ourselves with the daily performances of the Giants or the White Sox. I believe that the greatest propaganda which America can send out, not only to the foreign countries of the world, but from each to the other of our people, is the propaganda of first quality in goods and in service and in thought. We are on a high plane to-day in the eyes of the world. This is true in the matter of prices, wealth, and in opportunity. This is no time for us to

THESE GENTLEMEN ARE OFFICERS OF THE NATIONAL SUPPLY AND MACHINERY DEALERS' ASSOCIATION. FROM LEFT TO RIGHT THEY ARE: N. A. GLADDING, E. C. ATKINS & CO., INDIANAPOLIS, CHOSEN PRESIDENT; CHARLES W. BEAVER, RETIRING PRESIDENT; JOHN C. RUF, I. B. WILLIAMS & SONS, DOVER, N. H., ELECTED SECOND VICE-PRESIDENT.

introduce "shoddy" in service or in goods, or in thought. We cannot expect to make some classes of products as cheaply as they can be made in Europe. We want our people to have their share in the world's opportunities and high living standards. We want our labor to be better paid than labor is paid in Europe. We shall then expect just that much higher quality in workmanship. We must expect first quality in the integrity, efficiency, and capacity of our men. We must become noted for the quality of all things we do and make. We must make the words "Made in the U. S. A." the mark which is sought by all people in all lands who want the very best.

Problems of the World.

"It may seem to you that I have wandered far afield in dragging the economics of the world into a discussion about ways and means for us, as manufacturers of mill supplies and machinery, to secure more business and in so doing serve our dealers and jobbers more efficiently. I think the economic problems of the world to-day are so closely linked up that we cannot plan a trade revival in Cleveland or in Cincinnati, or in Philadelphia, without considering its far reaching economic effect on Siam or New Zealand, or some other equally distant country. I think the trouble with a good many of us in years past has been our tendency to stay at home and get our view of the passing world from our own front porch. We have not always been willing to put ourselves in the shoes of the other man to get his viewpoint. A great deal of the success of the world, in fact more than ever before, depends upon the practice of the golden rule between nations. It has always been reasonably easy for us to do unto our neighbors as we would that they should do unto us. We have never quite realized, however, that this rule is quite as necessary in our relations with strangers."

Report on Foreign Trade

Among the committee reports of interest was one made by H. F. Seymour, Columbian Hardware Co., Cleveland, on behalf of the foreign trade committee. Mr. Seymour emphasized the necessity of providing credit for purchases by foreign countries unable to finance their purchases in gold. He urged the creation of more foreign trade financing corporations under the Edge law and pointed out the importance of educating the investing public in the need of buying debentures issued by such corporations. He also recommended provision in our tariff laws that goods carried in American ships should have preferential treatment; at least the Government should prevent discrimination against the American merchant marine. There was also a recommendation that Congress take favorable action toward providing suitable appropriation for the carrying on adequately the work of the Department of Commerce in the development of foreign trade.

Industrial Legislation.

Dixon C. Williams, Chicago Nipple Co., Chicago, chairman of the committee on industrial legislation, reported that there are under contemplation by this Administration many reforms which, if carried into effect, will be greatly helpful to business. The difficulty is to get Congress and the Executive to agree upon plans of carrying out such reforms.

"Never in the history of the country have the magnitude and complexity of our problems been so great and so difficult of solution," said Mr. Williams. "Some weeks ago in attendance at a banquet in one of our Eastern cities I listened with deep interest to a member of the President's official family, who declared that these problems, the direct result in the main of the war, were greater than he had anticipated and so complex and difficult that he could not encourage the audience to believe that a short period of time would suffice for the solving of them, and he warned the audience not to expect any pronounced relief for many months to come."

Among the most pressing problems Mr. Williams enumerated the labor question, transportation, taxation, tariff, foreign relations, farm legislation, immigration, peace, governmental economy, Government control of industry, disarmament, general European conditions and our own internal social, moral and religious problems. He named the two most important as labor and transportation.

There is a widespread conviction, he said, that until there is a reduction in the cost of labor no immediate relief of importance to business men can be expected.

Discussing the railroad problem, he said that it cannot be solved by a reduction in the charge for labor alone; along with labor reduction must go economies all along the line.

On the tariff question Mr. Williams was emphatically opposed to duties which will prevent the free exchange of goods now so necessary in view of the fact that other nations owe us billions of dollars which they cannot pay except in merchandise. On this point he said:

"Without regard to previous convictions multitudes of the best business men and many of the most thoughtful newspapers of the country are loud in their condemnation of the tendency of legislation in relation to the tariff. Delegations of business men have visited Congress and in no uncertain tones have declared that the present so-called emergency tariff bill is radical and ruinous. They feel that this is no time for additional barriers when billions of dollars are owed by foreign countries to us, which cannot possibly be paid except through the importation of raw materials, food products and manufactured goods. They also look with dread upon the loss of foreign markets which they believe will result from such tariff legislation as is being contemplated. It is now a generally accepted view that all nations must prosper commercially with other nations and no one nation can expect to prosper at the expense of another. It is estimated that the new tariff act will not be passed until some time late in the summer and there are a few who expect that it will produce a revenue in excess of $500,000,000.00 annually, at the expense of the loss of a much greater sum which free exchange of commodities would produce and the business of the country will be left to bear the remainder of the heavy burdens which the indebtedness of the country and the country's carrying charges will entail. Appeals

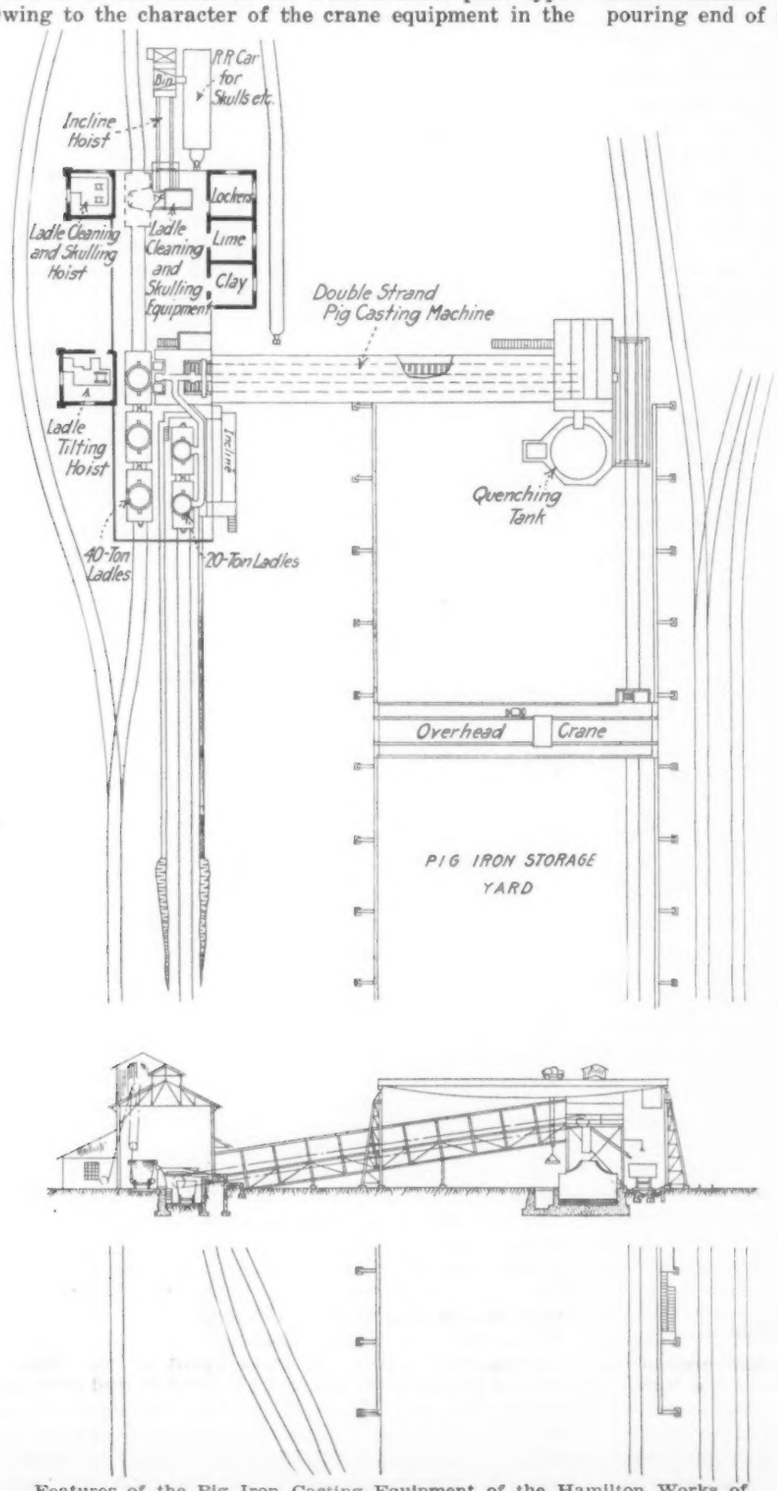
(*Continued on page* 1429).

Pig Casting Machine and Iron Storage

Equipment at Hamilton Works of the Steel Co. of Canada Includes Quenching Pit and Station for Transferring Iron Between Ladles

AT its Hamilton works the Steel Co. of Canada, Ltd., has recently installed and placed in operation a pig casting machine equipment and iron storage yard. The accompanying drawings show the general design and arrangement.

The hot metal is transferred from the blast furnaces to the pig machine and the No. 2 open-hearth plant in 40-ton ladles of the Pollock short pour type. Owing to the character of the crane equipment in the No. 1 open-hearth plant, it is necessary to use ladles not exceeding 20 tons capacity for the transfer of the hot metal to this department. While the smaller size ladle is ordinarily used for the delivery of metal from the blast furnaces to the No. 1 open-hearth plant, conditions naturally arise whereby it is desirable to be able to transfer metal from the 40-ton ladles to the smaller ladles. As a consequence, the cast house at the pouring end of the pig machine is arranged to permit its use as a transfer station, the same ladle tilting equipment being utilized for the delivery of the hot metal to the pig machine and to the smaller ladles. The arrangement of the trough leading to the smaller ladles is shown in the illustration.



Features of the Pig Iron Casting Equipment of the Hamilton Works of the Steel Co. of Canada Are the Arrangement for Transferring Molten Iron from the Large to Small Ladles, the Scheme for Delivering the Cast Pigs in a Pit of Water in Freezing Weather and the Equipment for Cleaning Ladles

The pig casting machine proper was built by the Pittsburgh Coal Washer Co., and consists of two strands supported on structural steel supports. Electric power is utilized throughout the equipment.

Iron is delivered from the pig machine by means of chutes lined with manganese steel plates, either to a railroad car or to a quenching pit. The latter is used when weather conditions are such that ice accumulates on the railroad car, etc., by the freezing of the vapors arising from the quenching water. When the quenching pit is used, it is partly filled with water and, after the iron has cooled, the water is drained from the pit and the iron lifted out and transferred either to a railroad car or to the iron storage yard by a magnet carried by the storage yard crane.

The pit consists of a heavy wrought steel cylinder set in surrounding concrete walls; the bottom of the pit is concrete protected by imbedded steel rails. The side of the tank adjacent to the chute is protected by vertical steel rails. The purpose of this construction of the pit is to avoid the difficulties experienced with similar pits constructed of reinforced concrete and which have not satisfactorily withstood the action of expansion, contraction and frost.

In cleaning and skulling the ladles, the operator stands on a platform in front of the tilted ladle and is protected by a sheet metal screen; the skullings are scraped from the ladle over a chute leading to a small skip car, which car in turn delivers them into a bin from which they may be discharged to a railroad car at convenient times. The skullings are cooled by a water spray as they pass to the skip car, and the arrangement is such that the latter may be immersed in water. The skip car is operated by means of a clutch controlled drum attached to the skulling hoist.

The iron storage yard is 100 ft. wide by 350 ft. long and is

traversed by a 5-ton overhead electric crane equipped with a magnet.

A railroad track, connecting to the yard system at both ends, extends along one side of the storage yard and is utilized for the delivery of iron from the pig machine to storage or from storage for shipment. Iron may be taken from the pit by the crane and magnet and delivered either to the storage yard or to railroad cars for transfer to the storage yard.

The equipment was installed under the designs and specifications of Frank C. Roberts & Co., Philadelphia, engineers for the company.

WAGE AND RATE CUTS

Probable Reductions Are Discussed in Pittsburgh Industrial Circles

PITTSBURGH, May 23.—Now that the Railroad Labor Board has announced that there will be a reduction, effective July 1, in wages of common railroad labor, there is much discussion and speculation here as to the size of the cut and incidentally of its effect upon freight rates. Early guesses as to the wage reduction ranged from 10 to 15 per cent, but the more common estimate now is 20 per cent, which would be in keeping with the one made recently by the Steel Corporation. In support of this estimate, attention is drawn to the fact that in industrial districts such as this one, competition between the railroads and the industries for a share of the common labor supply always is sharp. Labor always seeks the highest market and in the event that railroad scales are left higher than those ruling in industry, the railroads would be oversupplied. Since the railroads depend upon industries for business, the more natural arrangement would be for industrial wages to be above those paid by the carriers in order that there may be sufficient production for the railroads to move. Just now neither the railroads nor industries need a full complement of men, but looking ahead, it must be admitted that industries must get going before there will be a real need by the railroads of additional help.

As to freight rates, there is some difference of opinion both as to the extent of any reduction that may be made and also when it will be made. Some seem to figure that it will take some time to effect a reduction, this view being based on the theory that since the roads have not benefited by the present tariffs, they will be allowed to retain them for awhile after wages are cut, so they may put some money into their treasuries. Others express the belief that the wage and the freight rate reductions will be coincident. Those holding this belief assert that freight tariff clerks of both the Pennsylvania and New York Central systems have been busy for some time on tentative rates based upon lower wages and that these schedules will be ready for submission to the Interstate Commerce Commission as soon as the new wage scales are available. It also is pointed out that these roads and the roads throughout the country have pretty thoroughly liquidated the extra men engaged during the period of Government control. The fact that at this year's session of the Pennsylvania legislature the full crew law was repealed will help the railroads doing business in this State and it is within the bounds of possibility that other States will take similar action. This would seem necessary if roads engaged in interstate business are all to operate equitably. The crowning argument in favor of an early cut in freight rates is the admission privately made by some high railroad officials, that when they received last August all of the rate increases they asked, they received twice as much as they expected to get. As to the size of the rate cut, the more common estimate is 20 per cent from the present tariffs.

Have Not Followed Cambria

YOUNGSTOWN, OHIO, May 24.—For the present at least independent iron and steel makers in the Mahoning Valley will not follow the action of the Cambria Steel Co., chief subsidiary of the Midvale Steel & Ordnance Co., Philadelphia, in reducing day labor wage rates. The new Cambria company rate for day labor of 30c., reduced from 35c., compares with 37c. paid by Valley interests.

"A wage reduction on the basis of present reduced operations would be of little value to us," states a manufacturer. "We are considering a shutdown rather than a wage cut."

It is expected, however, that Valley employers will eventually be compelled to revise wages proportionately, as it was the action of Eastern independent competitors earlier in the year that forced the independents in the Valley to cut wages Feb. 16. In view of keen competitive conditions in the industry, such action seems almost certain.

Building trades labor disorganizations throughout the country have adversely affected business of a number of large fabricating interests in the Mahoning Valley, whose sales organizations embrace an extensive territory. Inflow of new orders has shown a tendency to drop off since the labor trouble started May 1.

Railroad Labor Reduction

The United States Railroad Labor Board, sitting at Chicago on May 17, announced that a general wage reduction for unskilled labor would become effective on about 90 railroads on July 1. The extent of the wage cut will be announced on June 1. This initial wage reduction will apply only to those railroads whose wage disputes were filed with the board prior to April 18, but it is expected to set the standard for all future decisions affecting the entire body of 2 000,000 employees who were granted a $600,000,000 annual wage advance by the board a year ago. Normally approximately 500,000 unskilled laborers are employed by the railroads of the country and most of the larger lines will be affected under the first decision of the board. Cases filed with the board since April 18, or which may be filed prior to June 6, will be heard on the latter date, and in these cases also the ruling will become effective July 1.

Dominion Plant May Resume

The Dominion Steel Corporation, Sydney, N. S., will resume operations immediately at the Sydney steel mills on full time if the employees will accept a further wage reduction of 10 per cent. The men are now considering their answer. About six months ago a reduction in wages of 20 per cent was put in force and since that time the employees of the corporation have been working only from one to three days a week. As a result of the above proposal as a means of obtaining rail contracts from the Canadian Government, the steel workers will ask for a Federal investigation into the steel industry of Canada, similar to that which is now being conducted in the coal industry. The formal request for an inquiry will stipulate that the probe be conducted by a committee of the Dominion House of Parliament.

Cambria Steel Co.'s Second Reduction

A wage and salary reduction will take effect at the Cambria Steel Co., Johnstown, Pa., as the result of a recent meeting of the board of directors. Common labor will be reduced from 35 to 30 cents an hour and the payment of overtime in excess of eight hours at the ratio of time and a half will be abandoned. This is the second reduction since last November and places wages back on the 1917 level.

Francis J. Dillon, business agent of the Pattern Makers' Union, Indianapolis, was fined $1 and costs and sentenced to serve 30 days in jail by the city court, for violating the picketing ordinance in threatening employees of various pattern works in the city where a strike is in progress. Judge Walter Pritchard said: "A man has a right to work for his living. Eight thousand men are out of work in Indianapolis. Those intimidated by these men are afraid to continue to work and are objects of charity for the city to support."

BLOOMING MILL MOTOR DRIVE

Electric Power Replaces Steam on Large Reversing Blooming Mill

BY B. M. JONES*

On Dec. 7, 1920, the engine driving the 44-in. reversing blooming mill at the Steelton plant of the Bethlehem Steel Co. broke down. Work was started immediately to tear down the engine which, as had been previously planned, was to be replaced by electric drive. On Dec. 31 rolling was started with the new electric motor drive. Considering the tremendous task of tearing down this large reversing steam engine, blasting out its foundations, building the forms for the motor foundations and installing the complete electrical apparatus in working order, the time taken, only 24 days, is considered remarkable.

Forms for the reversing motor foundation were built up complete in two pieces as a template before the engine was removed. After the old foundation was blasted out these templates were set in position, the foundation bolts placed, and the concrete immediately poured. This materially shortened the time required to make the change.

Production with the motor drive was 609 tons of steel the first day, 796 the second, and 1006 the third. The mill is now operating single turn, and is in no way curtailing the output in spite of the fact that, due to shortage of power, under the present condition it is necessary to operate the equipment with a power demand not exceeding 2500 kw.

The electric drive consists of a double unit reversing direct current motor, the necessary flywheel motor generator set for driving it, and a small exciter set, together with a blower outfit and the necessary switching equipment. All the machines except the blower outfit are mounted on the first floor of the motor room substation. The blower outfit is in the basement and the switching equipment on a balcony. Lightning arresters are installed on a second balcony.

*General engineer Westinghouse Electric & Mfg. Co.

Reversing Motor Direct Connected to Mill

The double unit reversing motor, as shown in the illustration, is a 600-volt adjustable speed direct-current machine of the compound wound compensated type, having a speed range of 0 to 120 r.p.m. in both directions. It is capable of developing 1,900,000 ft. lb. torque momentarily, and is directly connected to the mill, which lies behind the brick wall.

Electrically and mechanically, the motor is designed to withstand the overloads encountered in reversing blooming mill service, and in addition it is provided with a large thrust bearing on the pedestal nearest the mill, to protect it from the mechanical shocks of the mill, such as the breaking of a spindle. The ease and rapidity with which this motor can be started, stopped and reversed shows it to be inherently adapted to reversing blooming mill service.

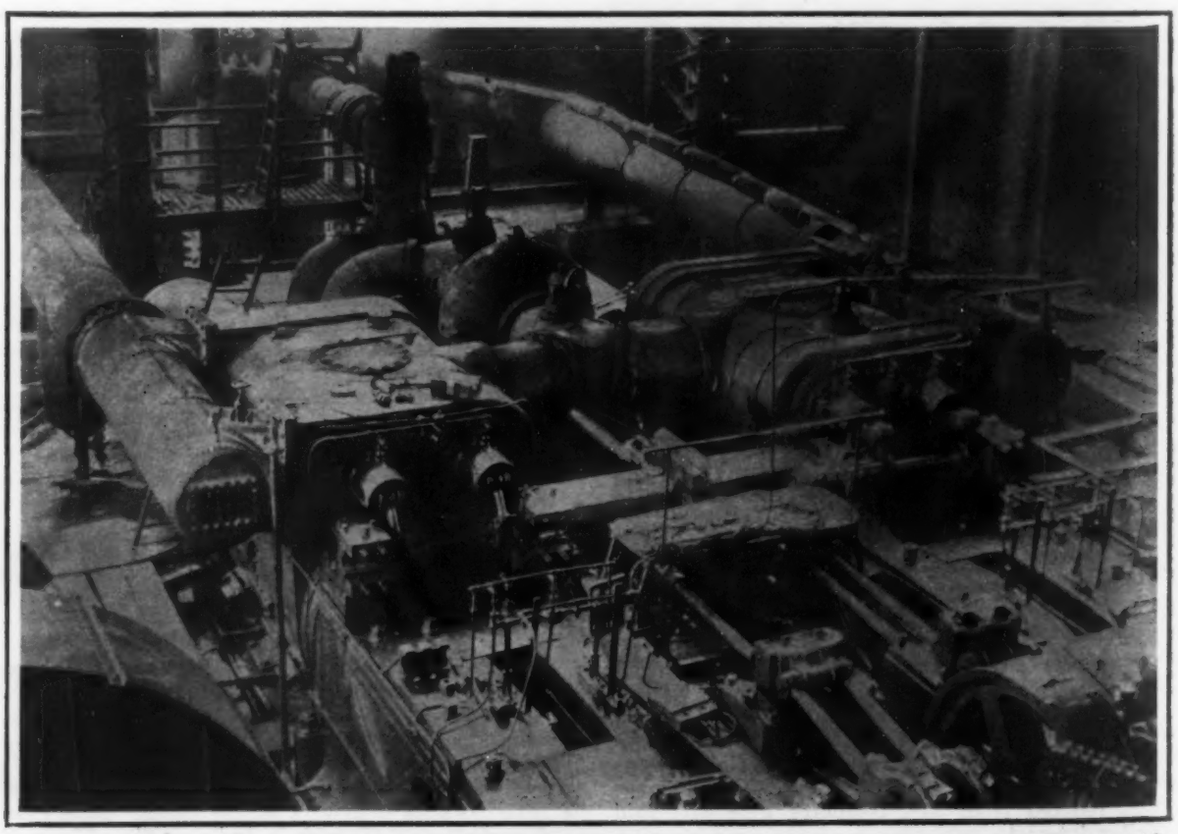
Flywheel Motor-Generator Set

The motor receives its energy from two 600-volt, 367 r.p.m. separately excited shunt-wound, direct-current generators of the compensated type, which are designed to withstand the same peak loads as the reversing motor. These generators are driven by a 3200-hp. alternating-current motor of the wound rotor type, which is designed to operate on a 3-phase, 6600-volt, 25-cycle circuit.

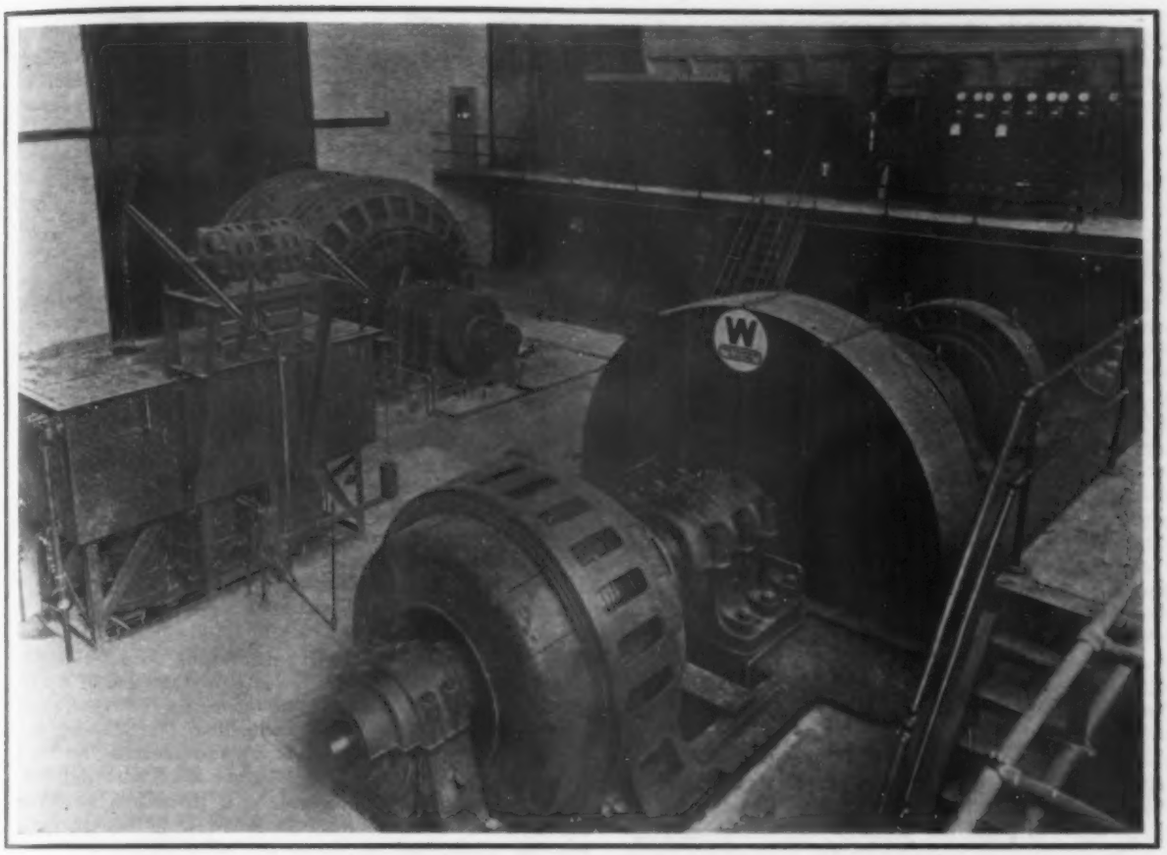
A 100,000-lb. flywheel is mounted on the same bedplate, between the motor and generators. This flywheel is completely inclosed with a plate cover to reduce windage losses, and also to afford protection to the operator. The flywheel bearings of this set are arranged for gravity lubrication, and for water cooling as an emergency feature.

Liquid Slip Regulator Controls Input

A liquid slip regulator limits the peaks and equalizes the input to the flywheel set. When the load on the alternating current motor reaches a predetermined value, the regulator introduces resistance



This Is the Engine Which Was Taken Out. Its massive character and complicated nature may be compared with the relative simplicity of the new drive



Motor Room Substation for Driving 44-in. Blooming Mill. In foreground is flywheel-type motor-generator set which furnishes power for the big motor, shown back of the slip regulator at left

in the secondary of the induction motor. This causes the flywheel set to slow down, thereby allowing the flywheel to give up a portion of its stored energy, and thus absorbing the peak load. When the peak load goes off, the regulator cuts out the resistance in the secondary circuit of the induction motor, and brings the flywheel set back to approximately full speed.

Will Do Other Than Shipbuilding Work

President James Whalen, of the Port Arthur Shipbuilding Co., Port Arthur, Ont., in the annual statement of the company stated: "In view of the present situation in regard to vessel construction, your directors have deemed it advisable to authorize the company to enter upon other work than shipbuilding, to which your plant is adaptable. Work has already been commenced upon a contract for 20 compressed air mine shovels for one company, and negotiations with other companies requiring this class of machine have advanced to such a point where other contracts seem assured. The undertaking of other suitable work, including the manufacture of pulp machinery and digesters, is also contemplated." Since the annual meeting, the company has gone ahead with plans along these lines and has made very satisfactory progress. It has secured the right to build for Canada several special machines that were formerly imported from the United States. Prominent specialists in this form of manufacture have also been engaged, and the location of the plant, the center of a large and somewhat isolated area of raw materials, gives importance to its future in the new field.

Plate Rate Sustained

WASHINGTON, May 24.—Interstate Commerce Commission has rendered a decision upholding the complaint of the Steel & Tube Co. of America and others in their complaint against the rate of 14c. per 100 lb. on steel car plates during Federal control from Indiana Harbor, Ind., to Michigan City, Ind. The commission held that this rate was unreasonable to the extent that it exceeded 6c. and made an award of reparation on this basis.

The Railroad Administration reduced the rate to 6c. in April, 1919, but fought the demand for reparation. In defense of the 14c. rate, it claimed that the rates for short haul traffic in and around Chicago was low prior to Federal control and application for permission to increase them was pending when the Government took over the railroads.

Southern Metal Trades to Meet

The Southern Metal Trades Association will hold its annual convention at the Battery Park Hotel, Asheville, N. C., on June 13 and 14. Besides the formal program there will be a barbecue at the top of Sunset Mountain, followed by a sight-seeing trip.

On the first day the following officers of the association will make reports: William T. Harding, Raleigh, N. C., president; W. E. Dunn, Jr., secretary, Candler Building, Atlanta, Ga., and J. Wayne Moore, East Point, Ga., treasurer. Magnus W. Alexander, managing director National Industrial Conference Board, New York, will speak on "Pressing Industrial Problems," and J. H. Hopp chief engineer Charles C. Kawin Co., Chicago, will talk on "Mechanical and Chemical Control of Foundry Products." George B. Cocker, president Cocker Machine & Foundry Co., Gastonia, N. C., will give a recitation, "Richard III."

The one address of the second day will be on "Idleness and its Relation to Industry," by T. W. Dinlocker, comptroller SKF Industries, New York.

Approximately 22,000 gross tons of shell steel and shell forgings will be sold through sealed bids, receivable by the Ordnance Salvage Board until June 6, 11 a. m. The material is scattered over the East, some of it being as far West as Ohio and some as far South as Virginia. Each bid must be accompanied by a certified check in the amount of 10 per cent of the total amount of the bid. Bids will be received for the entire quantity or for the total quantity in any one or more lots. Forms upon which bids must be submitted, and any additional information, may be obtained by applying to the chairman, Ordnance Salvage Board, War Trade Building, Washington, D. C., Chicago district Ordnance office, 7400 Ashland Avenue, Chicago, or Philadelphia District Ordnance office, 1710 Market Street, Philadelphia.

COST ACCOUNTING*

Necessary to a Knowledge of Operating and Selling Conditions

BY B. C. MOISE†

Important as costs are to the proper conduct of the sales end of the business, good costs are far more important to the production end. It is impossible for any factory or mill to manufacture to best advantage without a proper cost system. Unless they have such a system and study its results, it is impossible to know whether operations are proceeding along the best lines. They are working in the dark all the time. They do not know what materials are best suited for use in their particular lines of manufacture.

A good factory or mill manager may know what materials are easiest to handle, but unless he knows the cost of his product, he does not know whether some other materials not quite so easy to handle, but at a very greatly decreased price, would not more than compensate for the extra difficulty or labor cost involved in using them. Similarly, if the purchasing agent buys always the cheapest article, it may be that the excess cost of manufacture involved through the use of that article will many times offset the difference in price between the article in question and a higher grade material.

To the factory or mill manager, costs are absolutely essential. He cannot otherwise determine whether a certain mixture or a certain method of manufacture will result in a lessened cost or a greater cost, as compared with other mixtures or other methods. He cannot determine whether his practice, i.e., his percentage of product to scrap, is more profitable as compared with a different practice, perhaps making more scrap or less scrap. He cannot determine whether it is advisable to re-use his waste materials or re-treat them or whether the proportion of the different classes of product he makes and the order in which he makes such proportions are better or worse than some other methods. He cannot even determine a proper operating schedule or how the length of runs on various classes or sizes of product affect the profits of the company unless he has adequate and detailed cost data.

*From a paper read before the Pittsburgh section of the Industrial Cost Association, Feb. 23.
†Secretary National Tube Co., Pittsburgh.

How Cost Figures Should Be Shown

Costs should be as simple as it is possible to make them, consistent with giving all the necessary results. Necessary figures are indispensable; unnecessary figures are a pure waste, not only of money, but of what is more important, time and effort. Unnecessary figures tend to confuse the man who uses the costs instead of helping him.

A good cost system should involve no duplicate work. All operating, billing, and other records originating at the factory, or in the operating departments, should form a part of the final papers so far as possible, and should merely require completion by insertion of the different factors of price, extension, etc., when passed on to the next department, or to the general office.

Under modern conditions enormous savings in the preparation of costs can be effected by the use of up-to-date machinery. To-day, in addition to typewriters and adding machines, there are excellent multiplying and calculating machines, both hand and electric, and excellent tabulating machines for detailed distributions. In large companies it should be a principle, however, never to buy a machine unless it would be necessary to get one additional employee if the machine were not purchased, or unless the element of time is so important as to warrant the purchase of the machine on the ground that the multitude of details cannot be got out without its use.

Swedish Iron Situation

STOCKHOLM, SWEDEN, May 2.—At the close of the first quarter of 1921, no appreciable change for the better has been noticeable in the general situation and the downward trend of production, sales, and prices continue. Unemployment is on the increase and the number of mills compelled to introduce short-time or lay off men (if not close down altogether for the time being) is steadily growing. The situation, in short, hardly differs in its general outline from that of any other European iron country, excepting perhaps Belgium, and the export curve registers a fresh drop as a month passes by. The following figures speak for themselves: Exports of pig iron: January 8464 tons; February, 7510 tons; March, 1441 tons. The trend of prices may be seen from the subjoined tabulation:

(All prices in Swedish kr. per metric ton f.o.b. truck maker's mill, payment within 30 days.) (Figures in brackets denote prices converted into dollars at the rate of 4.37 kr. per gross ton f.o.b. Swedish port.)

	April 30		March 31
Export iron (0.015 per cent S.; 0.025 per cent P.)	190–200	($ 48.83 to $ 51.15)	190–200
Billets, annealed (over 0.45 per cent C.)	450–500	(110.44 to 122.06)	400
Wire rods (over 0.45 per cent C.)	500–550	(122.06 to 133.60)	450
Rolled open-hearth steel, soft, base price	300	($75.57)	315
Rolled Lancashire iron, base price	380	(94.17)	400

The only bright spots in the last quarter were the increase in ore shipments and the decrease in pig iron imports, the latter having dropped from 44,000 tons in the first quarter of 1920 to 23,500 tons for the corresponding period of 1921. Export shipments of ore are shown in the appended table.

	1921	1920	1913
	Tons		
January	244,100	136,000	338,300
February	289,300	173,000	354,800
March	356,400	241,700	314,300

Steel and Pig Iron Bought for Export

Some additional information is available in regard to two large lots of steel purchased several years ago for export to France. The first lot of 15,000 tons included 3000 tons of sheet bars, 3025 tons of soft billets, 4000 tons of small rounds and flats, 2000 tons of shell steel and about 3000 tons of miscellaneous products. Before prices started to decline last year, this lot was sold at $57 to Canadians and others, who resold at considerably lower prices.

The second lot consisted of 42,000 tons of steel, including 7000 tons of soft billets and the remaining tonnage shell steel, and also 5000 tons of Bessemer pig iron. On this lot a New York company a few days ago bid $17 per ton and is understood to have acquired the tonnage for resale purposes.

Proposed Japanese Merger

WASHINGTON, May 24.—The combination of six private iron and steel companies in Japan is proposed by the Government's Financial and Economic Investigation Committee, as a remedy for the present financial difficulties of the industry in Japan, according to a report prepared by the Far Eastern Division of the Bureau of Foreign and Domestic Commerce. It is suggested that the Japanese Government should give substantial aid to the combined companies which would have an output about equal to that of the Wakamatsu State and Steel Works, while these private plants and the Government works together would control about 90 per cent of the country's total production.

The Ludwig Loewe machine-tool shop at Berlin, well known in the American trade, reports net earnings of 5,127,000 marks for 1920, as compared with 2,290,000 marks for 1919; and the dividend is 24 per cent on a capital of 15,000,000 marks, against 18 per cent on 10,000,000 marks in 1919. The capital has recently been raised again to 30,000,000 marks.

Frequency Problem In Steel Industry*

Changing Conditions Favor 60 Cycles to Replace the 25 Cycles of Earlier Days — What a Change Would Mean

BY B. G. LAMME†

SOME fifteen years ago, recognizing the advisability for standardization of certain requirements in their work, steel mill engineers took up the question of choice of frequency. All electric power then used by the mills was produced in their own plants, which, in many cases, were of relatively large capacity compared with central stations. Apparently there was no question then regarding advisability of the generation of their own electric power, as this was the only way they could obtain it.

There were then only two frequencies in general use in this country, 25 and 60 cycles. The engineers, therefore, compared these two frequencies and studied their fitness for steel mill work. Various applications of electricity then in use and in contemplation were gone into quite fully. Manufacturers of electric and other machinery were consulted regarding the possibilities of various types of apparatus and equipment. There were three conditions of service which required special consideration, namely, (1) the operation of large very low speed induction motors; (2) transformation from alternating to direct current; and (3) parallel operation of slow speed gas engine-driven generating sets.

Much of the heavier steel mill service was at relatively low speeds with direct connected motors, or with as little gearing as possible, on the basis that large, high-speed, high-power gears would not be satisfactory. As motors up to 6000 hp. nominal rating, with speeds of 75 to 90 r.p.m., were considered necessary in certain applications, it appeared, from all points of view, that for such work 25 cycles was far better than 60, from the standpoint of both general performance and first cost.

Choice of 25 Cycles at Gary

The Gary plant illustrates certain extreme conditions undertaken in some of this earlier pioneering. Everything was more or less new and special in this electrification, and Gary was frequently cited as an entirely electric-driven steel mill. There were here many conditions of motor drive which, even with very slow speed motors, required huge gears for still further reduction in speed. Some of the ultimate speeds, at the load, corresponded with 6 to 10 r.p.m., obviously representing impossible conditions for direct motor application. Even with gearing, the conditions of motor drive were such that 60 cycles would have represented impracticable conditions, so that 25 cycles became a practical necessity. This Gary plant had a decided influence in fixing 25 cycles as a standard for steel mill work.

This choice of 25 cycles at that time was undoubtedly correct, with the knowledge and experience available. Moreover, if 60 cycles had been chosen instead of 25 cycles, it is probable that steel mill electrification would have been greatly handicapped in many ways. and would not have reached nearly the stage of development that has been attained to-day.

Development of Large Central Stations

Fifteen to twenty years ago large central stations for general power supply were almost unknown. There were lighting stations and railway stations, and there were power stations furnishing individual industries, but there were practically no central stations for the general supply of power for all purposes, as have developed during the past few years. With the gradual recognition of the advantages of centralized power plants, the smaller lighting and general power distributing stations began to expand and reach out toward the isolated and special service plants.

Gradually, as the central stations increased in capacity, they began to make special power rates to the railway and to the industrial companies, which were better than these companies could obtain from their own generating plants. Consequently, there was soon a tendency to shut down the individual plants, and purchase power from the central plant. This action has been cumulative, for the more load that was taken over by the central plant, the bigger the central plant became, and the better rates it could make. In this growth the tendency has been very largely, and in recent years almost exclusively, toward 60 cycles as a general-purpose frequency.

Mutually Conflicting Elements

Speeds, frequencies and the economical combination of poles are intimately inter-related. High speed results in lower first cost of machine, but low speed is most in demand in steel mill work. In the development of induction motors the tendency was toward higher speeds, and 60 cycles here present material advantages.

One condition which now lends itself toward the use of 60 cycles in steel mills has been the increased use of gearing, thus allowing higher speed motors. For many kinds of service gearing is now used where direct connection, a few years ago, was considered as the only method. In consequence, the speeds of the motors used in steel mill work will average much higher than a few years ago.

A Super-Plant for Pittsburgh Mills

The question of purchase of 60-cycle power depends, of course, upon many conditions. In the Pittsburgh district, for instance, the total electric power used in the various steel mills may represent the equivalent of a huge power plant in itself. In consequence, if the various mills were to combine their power plants into one general plant, the capacity of such plant and the conditions of operation would probably be such that it could compete favorably with any large central station, and in such case 25 cycles could be the frequency. Moreover, this would remove the manufacture of power from the mills themselves and place it in a plant whose sole business would be the manufacture and supply of electric power.

It may be suggested at this point that, at present, furnace gases are used to a greater or less extent under boilers for steel mill power plants, and that with the power plant placed elsewhere these gases would be wasted. But there is not much doubt that other uses would be found for such gases, for some of the steel mills now use all the furnace gases without burning them under the boilers.

However, in considering a single large power plant, the Pittsburgh district presents very unusual conditions in the concentration of many huge steel plants within one relatively limited district. A combined steel power plant in the Pittsburgh district would, therefore, represent a very special rather than a general condition, and would furnish the solution of the problem for only one district. Elsewhere the problem of 60 cycles versus 25 cycles would still have to be met.

In conclusion, it may be said that there is no good general solution to this frequency problem; each case must be handled on its merits, taking future tendencies

*Abstract of paper before joint meeting of Association of Iron and Steel Electrical Engineers and American Institute of Electrical Engineers, Pittsburgh, April 16.

†Chief engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

and growth into account. In many cases the large existing 25-cycle local systems should be retained until such time as the need for replacement is more obvious than at present. Unless the future service of the mill shows strong indications of going almost entirely to 60 cycles, a mixed generating plant is not to be recommended.

In those cases where existing 25-cycle power and purchased 60-cycle power are both to be used, they should at first have their own individual services or areas, as far as possible, to avoid indiscriminate mixing of services throughout the mills, and to avoid frequency changers, with their attendant losses, unless conditions are such as to warrant their use. Where both frequencies are liable to be used for some time to come, and there is any real necessity for a tie between the two, then frequency changing becomes a necessity. However, as central station service has now become quite reliable, there is not the same need for a tie between two frequencies as formerly, so that doubtless, in many cases, frequency changers can be dispensed with.

FERROMANGANESE SUPPLIES

Output in First Quarter Heavy—Available Supplies Ample—Sharp Increase in Spiegeleisen

Considering the decline in the pig iron production of American blast furnaces in the first quarter of this year, the output of ferromanganese and spiegeleisen was exceedingly heavy. It was larger than the monthly output in 1919 and only about 4000 tons per month less than the very heavy production in 1920.

The ferromanganese output was 19,178 tons per month for the first quarter of this year against 23,557 tons per month in 1920 and 14,923 tons per month in 1919. It was nearly 10,000 tons per month heavier than in 1913, when the Steel Corporation was the largest and almost the only producer.

A marked increase in the spiegeleisen production was recorded in the first quarter, the monthly average having been 11,667 tons which compares with 8620 tons per month in 1920 and 5449 tons per month in 1919.

The following table gives the production of ferromanganese and spiegeleisen for the first quarter and for previous periods.

Ferromanganese and Spiegeleisen Output in the United States in Gross Tons

	Ferro-manganese	Spiegel-eisen	Total	Average per Month
January, 1921	19,686	2,542	22,228	.....
February, 1921	17,447	11,566	29,013	.....
March, 1921	20,401	20,893	41,294	.....
First quarter, 1921	19,178	11,667	.....	.....
Total, 1920	282,681	103,448	386,129	32,177
Total, 1919	179 029	65,391	244,470	20.732
Total, 1918	345,306	249 002	594,308	49,525
Total, 1917	257,834	188,852	446,686	37.222
Total, 1916	208,389	197,518	405,807	33,817
Total, 1915	146,542	93,282	239,824	19,985
Total, 1914	106,083	100,365	206,448	17.204
Total, 1913	119,495	126,081	245,576	20,464
April, 1921	9,566	14,744	24,310	.....

The April production of ferromanganese fell to 9566 tons while the spiegeleisen output was large at 14,744 tons.

Available Supplies

The available supplies of ferromanganese for the first quarter and other periods were as follows as obtained from an analyses of the output, imports and exports:

	Output	Imports	Exports	Available Supply
January, 1921	19,686	1,107	118	20,675
February, 1921	17,447	854	42	18,259
March, 1921	20,401	790	20	21,171
First quarter, 1921	49,178	917	60	20,035
Average per month, 1920	23 557	4,938	288	28,123
Average per month, 1919	14,923	2,752	255	17,420
Average per month, 1918	28,775	2,264	298	30,741
Average per month, 1917	21,486	3 703	776*	25,413
Average per month, 1916	17,365	7,577	...	.....
Average per month, 1915	12,021	4,605	...	.....
Average per month, 1913	9 958	10,672	...	.....
5 year average (1910-14)	8,280	8,399	...	.....

*First half only.

Available supplies for the first quarter were 20,035 tons per month which compare with 28,123 tons per month and 17,420 tons per month in 1919.

There has been a sharp decline in the imports with British alloy, the average to April 1 having been only 917 tons per month against 4938 tons per month in 1920. In fact, the present rate is the lowest on record.

Exports of the American alloy have also declined to 60 tons per month for the first quarter or the lowest outgo so far as records go.

Manganese Ore Imports

Imports of manganese into this country have been very heavy thus far this year, as the following table shows:

Manganese Ore Imports in Gross Tons

	Total	Average per Month
January, 1921	59,248	.....
February, 1921	53,874	.....
March, 1921	69,710	.....
First quarter, 1921	182,832	60,944
Total, 1920	601.437	50.119
Total, 1919	332,344	27,779
Total, 1918	491,303	40.942
Total, 1917	629,972	52,498
Total, 1916	576,324	48.027
Total, 1915	320,784	26,732
Total, 1913	345,084	28,858

Imports for the first quarter have been 60,944 tons per month or the heaviest on record. This rate compares with 50,119 tons per month in 1920, the best record having been 52,498 tons per month in 1917.

British Supplies of Ore

There has been a falling off in receipts of manganese ore in Great Britain, but it has been slight. The following table shows that country's imports compared with former periods:

British Imports of Manganese Ore

	Total	Average per Month
January, 1921	48,312	.....
February, 1921	35.193	.....
March, 1921	20,987	.....
First quarter, 1921	104.492	34.830
Total, 1920	452,613	37,718
Total, 1919	265,800	22,156
Total, 1918	365,606	30,467
Total, 1917	331 264	27,605
Total, 1916	439,509	36,625
Total, 1915	377,324	31,443
Total, 1914	479.435	39 953
Total, 1913	601,177	50,098

The monthly average imports for the first quarter of this year have been 34,830 tons per month which compares with 37,718 tons per month in 1920 and 50,098 tons per month in 1913.

Supplies and Needs in 1921

In THE IRON AGE, May 13, 1920, it was estimated that with a steel output for this country in 1920 of 45,000,000 gross tons, there would be required 306 000 gross tons of ferromanganese, or, with the 10,000 tons used in the iron foundry industry, 316,000 tons. This would mean theoretically a consumption of 26,330 tons per month. This would represent normal requirements. The foregoing analysis shows available supplies at the end of the first quarter of this year as 20,035 tons per month. With the April rate of steel ingot down to about 17 242,000 tons per year, there are ample supplies available.

Similar reviews of the manganese-iron alloy situation appeared in THE IRON AGE, Dec. 6, 1917; Jan. 31, 1918; April 11, 1918; July 25, 1918; Dec. 28, 1918; Feb. 20, May 15, Aug. 28, Dec. 4, 1919; Feb. 19, May 13, Sept. 2, Nov. 11, 1920, and Feb. 17, 1921.

John L. Lewis, president of the United Mine Workers of America it is understood, is being extensively backed for the position of president of the Federation in opposition to Samuel Gompers, and it is expected a hot fight will be made on his behalf.

The S. & O. Sheet Metal Works of Detroit has been organized, with a capital of $12,000 by Otto Schwartz, 2549 LaSalle Gardens, and others. The company will deal in sheet metal, fabricate sheet metal buildings and erect them.

Dodge Brothers' New Power Plant

First Unit Now Ready for Service — Detroit Automobile Plant Conserves Valuable Space — Combined Cooling Tower and Shipping Platform a Feature in Layout —Stacks Atop Building

CONSERVATION of ground space and economy in handling fuel and ashes, as well as various construction details, are predominating features in the design of the new power plant for Dodge Brothers, Detroit. The boiler and generator room floors are 35 ft. above grade, and a large cooling tower has been so constructed that all the ground space beneath it is utilized for other purposes.

Ultimately the plant will have capacity to supply the entire electrical and heating loads for the Dodge Brothers automobile plant, It is being built on the unit plan, the first of four units having now been completed. Each unit will consist of two boilers and generating capacity of 10,000 kw. Three units of boilers have been installed, each unit consisting of two 1287-hp. Connelly water tube boilers.

The first generating unit has been sub-divided into two Allis-Chalmers 4000-kw. turbine generators, this size being installed now because they could be secured for earlier delivery than larger units. Power is generated at 4600 volts, 3-phase, 60-cycle alternating current, which is stepped down by transformers at the point of use. The power plant at present consists of a boiler house 100 x 128 ft. and a generator and switch house 90 x 51 ft.

Boiler Installation Well Above Grade

To conserve space for future manufacturing purposes, the boiler room was placed 35 ft. above grade. This permitted the installation of large capacity ash hoppers, which dump directly into standard railroad cars, eliminating ash-handling machinery. As the tracks under the ash hoppers extend through to the manufacturing departments, this arrangement allows the use of the same tracks for delivering material to the plant and taking out loaded cars from the shipping department.

Two tracks run under the boiler house and a third, beneath the turbine room floor, is made accessible to the turbine room through a removable floor slab opening in the floor. This permits the handling of equipment to and from the turbine room with a 4-motor, 50-ton crane and 10-ton auxiliary hoist, supplied by the Northern Engineering Works.

Further conservation of space follows having the stacks directly above the power house, instead of at the side. While this construction has been adopted in some central power stations, it is unusual in a manufacturing company's power plant.

The power plant building is of structural steel frame, with concrete floors and brick walls. All the equipment including stacks, except turbo generators and condensers, are carried on the structural steel frame. The roof is of monitor type with concrete tile. While designed primarily for utility, the building has considerable architectural merit. The exterior is of concrete beam and column treatment with face brick panels. Special arrangement of sash gives ample light at all parts necessary for the operation of the plant, especially around the coal-handling equipment and in aisles. The turbine room is separated from the boiler room by partition of steel sash, giving ample lighting facilities at rear and between boilers.

Self-Supporting Stacks Surmount Structure

Each pair of boilers has a self-supporting stack extending 170 ft. above its base, or a total height of 270 ft. from the ground. Each stack is carried on four heavy main girders 6 ft. 6 in. deep, which in turn are supported by the center columns of the building. The girders are built up on 24 x 20 in. columns placed on 28 ft. centers transversely, and 25 ft. 7 in. centers lengthwise. The stacks, built of ¼ in. to ⅛ in. plate, brick-lined, are 13 ft. in diameter at the top and flare to 18 ft. at the bottom.

The breechings connect at the top of the boilers and join the stack on the side near the base, one on each side for one boiler. With the elimination of short turns and bends in the breeching, the gases have a direct flow into the stack. The breechings at the uptake of the boilers are 2 ft. 10½ in. wide and 22 ft. 8 in. long, extending across the boiler. At the point of connection with the stack they are 13 ft. 7 in. in height and 6 ft. in width. They are constructed of ¼-in. plate reinforced with angles.

Handling Coal from Cars to Boilers

Coal is dumped into a single hopper, located under the two tracks that run alongside the boiler house. As the hopper is 80 ft. long and approximately 26 ft. wide, four cars can be dumped into it at one time.

The plant is equipped with a double system of motor-driven Link-Belt coal-handling machinery. From the hopper the fuel goes through 16 gates, hand operated from the pit floor, to apron conveyors 30 in. wide and 104 ft. long. These feed to two 4-roll, 24 x 36-in. coal crushers which discharge onto two 30-in. belt conveyors, and which in turn discharge into 24 x 30-in. pivoted bucket elevators that carry the fuel to the top of the boiler house. The elevator runs on 105 ft. vertical centers. The bucket elevator discharges fuel onto two 24-in. belt conveyors that run longitudinally and discharge into the coal bunker. Each coal-handling outfit has a capacity of 75 tons per hour.

Extending the length of the boiler house, the bunker is located between the center columns above the boiler

Mounted on the Roof of a Two-Story Loading Station, the Cooling Tower Reaches 104 Ft. into the Air. It was designed to resist severe wind stresses, and to take advantage of high winds for cooling condensing water without running the fans

room floor, and supported by the structural work of the building. It has concrete walls and bottom, is 26 ft. wide and 20 ft. high, and has a capacity of 1600 tons.

From the bunker, coal is fed through chutes (two for each boiler) to the hoppers of the stokers. The chutes are built of structural steel and plates, their dimensions at the bottom being 1 ft. 9 in. x 8 ft. 8 in. Provision has been made for the location of scales between the bunker and the chutes. The boilers are fed with Riley 72-retort extra long underfed stokers.

Ash from the burned coal, collecting at the rear of the firebox, is dumped by a dump plate into an ash hopper lined with special firebrick that has high heat-resisting and abrasive qualities. The ash hoppers, one for each boiler, are 10 ft. wide, 25 ft. long and approximately 12 ft. deep. From the hoppers the ashes are dumped into railroad cars through 5 ft. x 5 ft. sliding ash gates operated by air cylinders.

Forced draft for the boilers is supplied by No. 110 Sturtevant "turbo-vane" fans with a capacity of 54,200 cu. ft. of air per minute against a static pressure of 7¼ in. Each fan is driven by a 100-hp. variable speed direct-current motor.

Walls and bridge-wall of the boilers are built of firebrick, with special bonding tile anchored to the steel-work of the boiler setting. The walls, provided with expansion joints throughout, are separated from each other and from the boiler proper by these joints. Each of the four walls is a separate structure having its own steelwork, and the bridge wall is also a separate unit. As the expansion joints permit each wall to move in any direction without causing strains in the adjoining walls, this prevents their cracking.

Turbo-Generators on Independent Supports

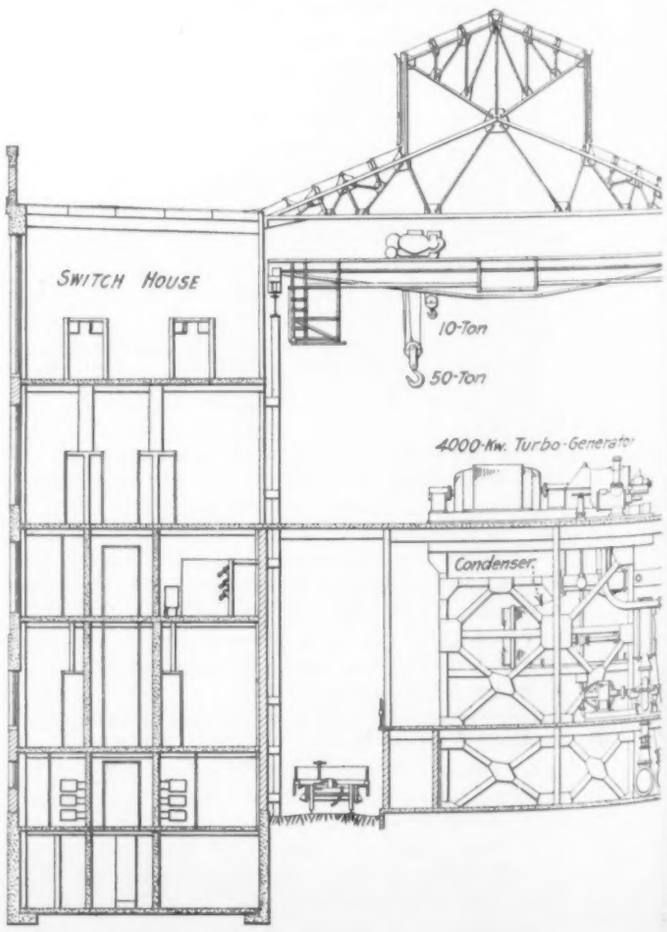
The turbo-generators, located 35 ft. above grade, are carried on a structure entirely independent of the building, so that no vibration is carried to the building proper. The generators are supported on a heavy built-up steel foundation consisting of a capping of two 30-in. Bethlehem I-beams, structural framework and reinforced concrete. The capping is supported in turn by six 12 in. Bethlehem "H" columns. These "H" columns are carried by heavy concrete mat. The condensers are supported by lugs on the framework of the turbine support.

All auxiliary equipment, including boiler feed pumps, forced draft fans, condensate and circulating pumps and hot well and house service pumps, are motor-driven by General Electric 220-volt direct-current variable speed motors with field and armature speed control. The motors for the coal-handling equipment are General Electric 3-phase, 60-cycle, 440-volt alternating current, controlled by push buttons which start and stop the various conveying units progressively in the proper order. In connection with the control are alarms throughout the part of the building occupied by the coal-handling equipment, which, whenever the machinery is started or stopped, sound a warning to workmen around the plant. Also, at various convenient points, emergency buttons are placed, so that the entire equipment can be stopped immediately.

Piping and Connections Include Special Fittings

Two 10-in. high-pressure boiler leads drop from the outlet of the superheater at the side of the boiler to the fan-room floor, where they are connected through a lateral fitting into a 10-in. supply line from each unit. These are connected through 10 x 20-in. reducing fittings to 20-in. crosses which form distributing points for the steam supplies to the turbine units and auxiliaries. The crosses are connected with each other through a 12 x 20-in. reducing fitting and 12-in. double offset pipe bends, which arrangement allows any generating unit to receive its supply of steam from any boiler unit, thus providing flexibility in the operation of the system. From the 20-in. crosses steam is supplied to the turbines through 10 x 20-in. reducing fittings and 10-in. bends.

The 20-in. crosses are of special design, having

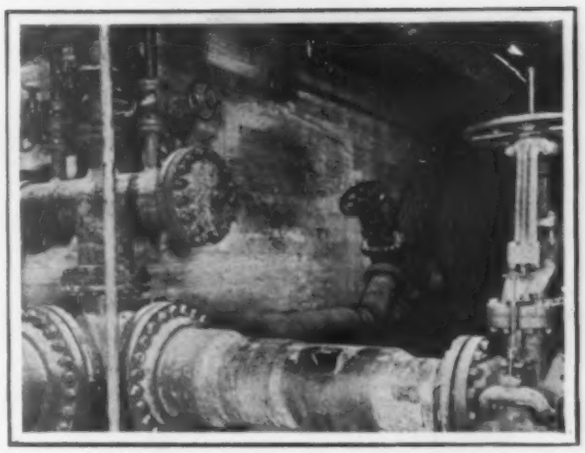


four 20-in. openings horizontally and one 12-in. opening on top and at bottom. The horizontal openings receive steam from the boiler units and distribute it directly to its turbine unit or, by means of the cross connection, to adjacent turbine units. The bottom opening serves as a connection for the 12-in. drip pocket for removing condensation, and also is provided with a flanged plate bolted to it and the building construction, thus forming an anchor for the piping system. To the 12-in. top opening is bolted the manifold for supplying steam to the auxiliary equipment.

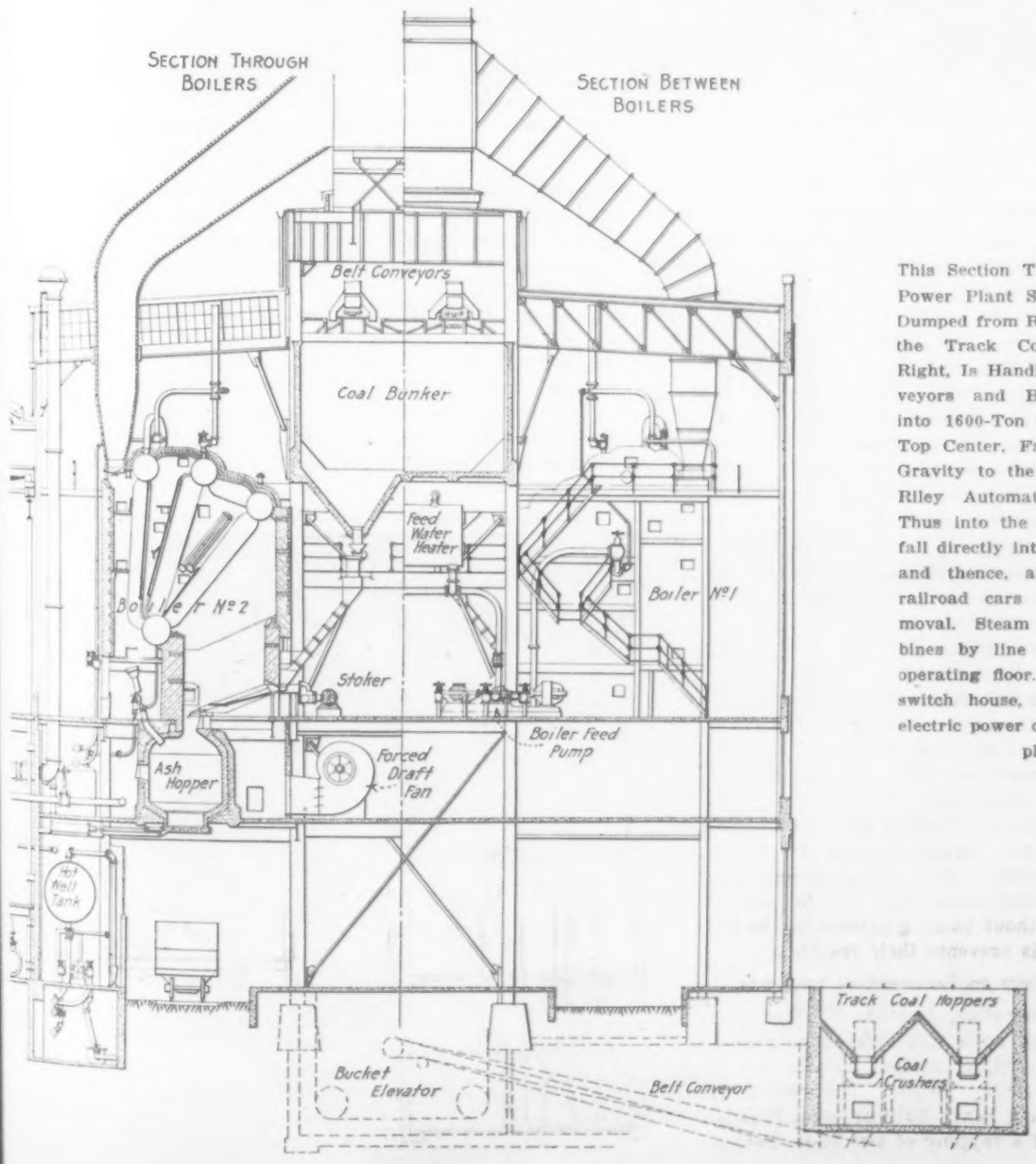
All piping, except as noted below, is of black steel of standard weight, except the bends in the high-pressure steam lines, which are extra heavy. All the high-pressure piping is provided with Van Stone flanges and cast steel flanged fittings. The 20 x 10-in. reducing fittings are of forged steel, have Van Stone flanges, and are unusual because of their length, being 5 ft. 9 in. and 9 ft. 3 in. long. The manifold is made up of 12-in. wrought steel pipe with welded nozzles equipped with Van Stone flanges. The drip pocket is forged from 12-in. pipe and tapped for water glass.

Water Cooling Plant Tops Loading Platform

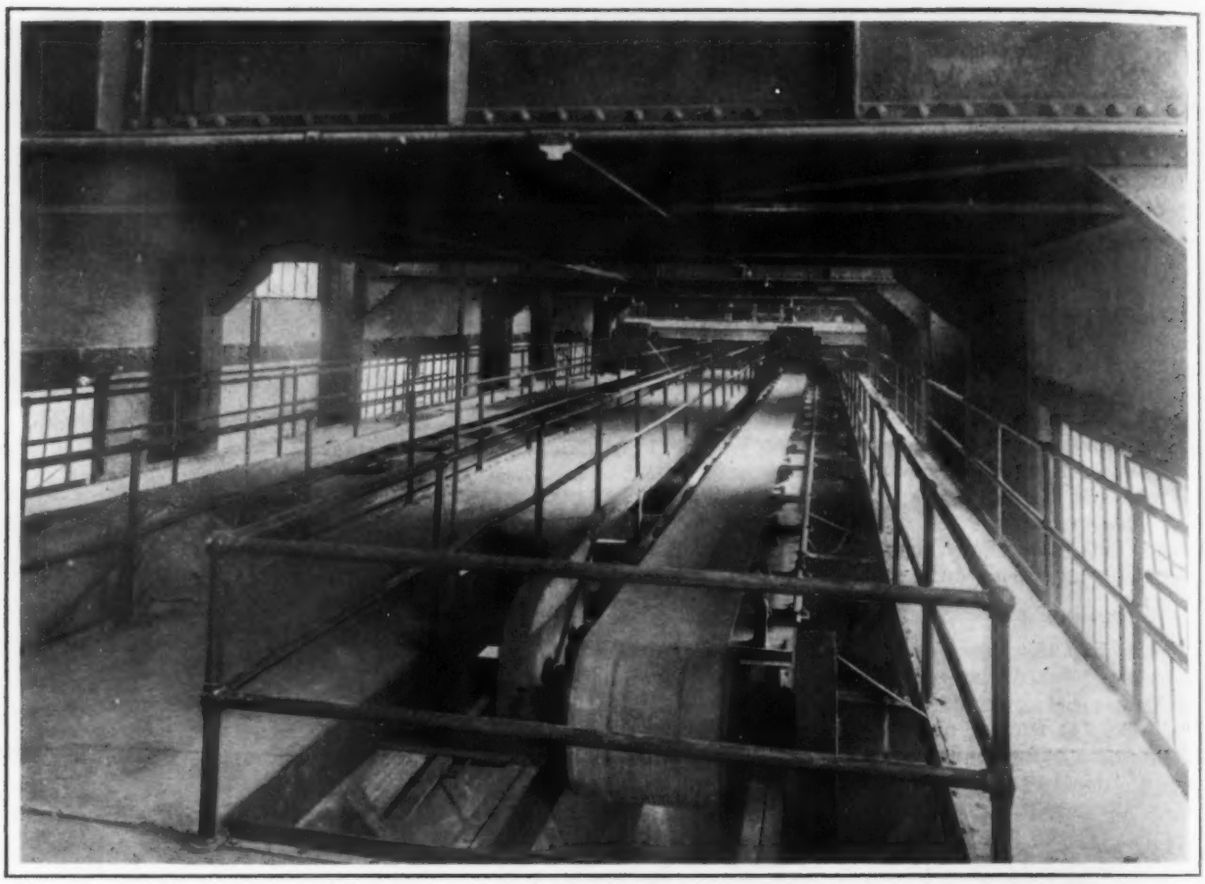
For cooling the water used in condensers, a combined induced and natural draft cooling tower of large capacity has been erected. This is a frame structure 52 ft. wide, 144 ft. long and 104 ft. high. The tower is designed to cool the maximum amount of water in the minimum amount of space. Its foundation and collecting basin serve as the roof of a two-story loading platform, the lower story of which is used for loading automobiles on cars (there is a railroad loading track on each side of the tower) and the upper story for the storage of cars awaiting shipment. The tower itself extends 75 ft. above the loading platform, which is built of concrete and steel, and is supported on heavy concrete foundations made necessary on account of the



Special Cast Steel Cross and Forged Steel Reducers and Manifold at Main Steam Header on Fan Room Floor



This Section Through the New Power Plant Shows How Coal, Dumped from Railroad Cars into the Track Coal Hoppers at Right, Is Handled by Belt Conveyors and Bucket Elevators into 1600-Ton Coal Bunker at Top Center, Falling Thence by Gravity to the Hoppers of the Riley Automatic Stokers and Thus into the Furnace. Ashes fall directly into the ash hopper and thence, at intervals, into railroad cars for ultimate removal. Steam is carried to turbines by line under the main operating floor. At left is the switch house, for handling all electric power outward from the plant



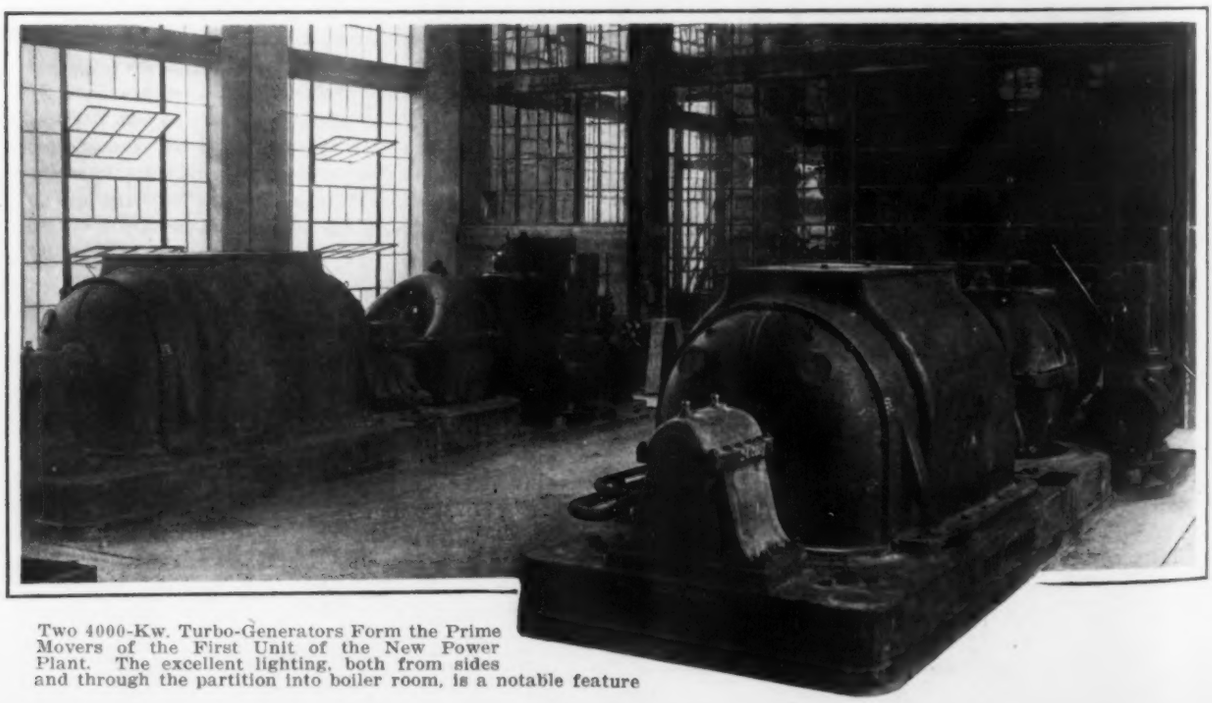
Over the Coal Bunker Run Two Belt Conveyors with Arrangement for Switching the Coal into Any Desired Section of the Bunker. This coal has already been hoisted 105 ft. from railroad delivery hoppers and intermediate crushers before it reaches these conveyors

high wind stresses for which the structure is designed.

Circulating water from the condenser in the power house is pumped underground through 36-in. Lock-Bar riveted steel pipe and delivered through 12-in. steel pipe risers below induced draft fans into the nine sections of receiving basins into which the cooling tower is divided. From the receiving basins the water trickles down through a wood filter, which breaks it into small particles and exposes it to the upward current of cooling air. The falling water, collected into a receiving basin at the base of the tower, is returned through a 36-in. pipe to the power house.

Indirect draft for cooling is supplied by 18 fans arranged in pairs, but operation is on natural draft when the station has a light load, or when a high wind prevails. The tower has a capacity of cooling 18,000 gallons of water per minute from a temperature of 105 to 85 deg. Fahr., when the outside temperature is 72 deg. and the relative humidity 69 per cent.

This power plant was designed by Smith, Hinchman & Grylls, architects and engineers, Detroit, in collaboration with Dodge Brothers' engineers, and the erection of the plant was carried out by the construction department, under the personal direction of Charles H. White, superintendent of power and construction.



Two 4000-Kw. Turbo-Generators Form the Prime Movers of the First Unit of the New Power Plant. The excellent lighting, both from sides and through the partition into boiler room, is a notable feature

Reorganization Plans Received with Favor

House Committee on Appropriations Approves Secretary Hoover's Proposed Investigation of Domestic and Foreign Problems Relating to Industries

BY L. W. MOFFETT

WASHINGTON, May 24.
THE IRON AGE BUREAU,
816 Fifteenth Street.

PLANS of Secretary of Commerce Herbert Hoover for a practical reorganization of the Bureau of Foreign and Domestic Commerce to meet the present commercial situation and problems involved in the foreign trade have been received favorably by the House Committee on Appropriations. While in reporting out the second deficiency bill it has not directly granted requests of Mr. Hoover, among them an item of $250,000 for expansion of foreign trade, it is considered that it has met the situation. This has been done by authorizing the secretary to transfer appropriations from the Bureau of Census. It remains to be seen, however, what the House itself and the Senate may do.

In appearing before the House Committee on Appropriations last week, Mr. Hoover first took up an item calling, among other matters, for an appropriation of $15,370 for two assistant directors at $4,000 each, and an expert on commercial laws in foreign countries. He said the proposed reorganization starts fundamentally with the proposition that through the Bureau of Foreign and Domestic Commerce and the Consular Service an agency for recruiting foreign commercial information is maintained, but there is lack of a link to bring the service into direct connection with the industries of the country. He pointed out that the department is proposing to set up 12 small divisions in the Bureau of Foreign and Domestic Commerce comprising experts in different industrial groups, machinery, chemicals, cotton, wool, minerals, oils, textiles, foodstuffs, etc., with a view to establishing efficient cooperation with those special industrial groups. These divisions are to direct the foreign service so as to secure the results from the service that are needed by the industries themselves. On the other hand, Secretary Hoover said, they are to distribute this preparation among those groups. From these men the bureau will furnish experts for special investigations into particular trade conditions abroad requiring special skill.

A Few Experts Needed

"We have in view the setting up of service committees in some of the different industrial groups," said the Secretary. "These committees will be purely voluntary and their object is to assist the bureau in guiding our foreign service to practical results for the industry, and on the other hand, to give encouragement to the industries to push ahead. In order to carry out that plan effectively, we need to have a few men who are expert in their particular branches of industry.

"For instance, in the automobile trade—now one of our large exports—we need someone in the bureau in Washington who is expert in that industry, who can secure as far as may be collective activity of the trade in the expansion of our exports, who can instruct our foreign service as to what the industry needs by way of the complex questions involved in exports and markets, and who can assure the distribution of this information back to the trade, and can stimulate the trade to take action under it. One difficulty now is that a large amount of information comes in, and we are not equipped to give it adequate preparation and distribution. Another is that information is collected abroad by men without expert direction from home, having in view the particular necessities of our different industries. The foreign service employees endeavor to the best of their ability to secure information that will be of use to the American trade, but they are without proper direction from home. In other words, we lack a general staff in planning and plotting out the directions where we can extend our commerce to the best advantage. The world is faced with an entirely new era in foreign trade. Due to the economic situation abroad, there is a growing tendency to consolidate for militant export purposes in practically every country in Europe. This is developing in two directions. In the first place, the consolidation of industrial concerns by mergers of capital, and in this direction the developments are more general even than in the United States before the anti-trust laws. There is another type of combination for export trade which consists in the direct combination of exporters for unity in the exploitation of foreign markets.

"If we are to meet these combinations, we must secure more collective action on the part of our industries. I have a feeling that if we are told to hold our own, we must at least be able to furnish the special information upon which our people can act and such information must be secured under expert direction."

Foreign Combinations

Mr. Hoover said that another new factor in foreign commerce requiring a great deal of study and consideration is foreign combinations for imports. This results in the whole buying for a nation of a given commodity so that these combinations may more or less dictate prices within the United States. It was stated that it is necessary to have a general staff of specialists to work out, in cooperation with American industries, policies and methods to meet those forces.

Mr. Hoover then dealt with an item providing an appropriation to bring back home some of the foreign commercial attaches and trade commissioners once every two or three years in order that they may keep in touch with the United States and that they may be made familiar with American industries, thus going out afresh with a knowledge of what the conditions and needs of American industries are.

Duplication of Work

Mr. Hoover, speaking of duplication of work by the Commerce and State departments, said he thought there is a well defined line between the two services and one that it is hoped to develop still further; that the purpose of the Department of Commerce is the study of the larger economic currents and the things that more greatly affect trade, as distinguished from the removal of local obstructions, of the type consular agents perform in connection with the difficulties of the merchants at the port.

He said it is true that consular agents obtain a great deal of trade information, but it is information that is entirely local, as distinguished from a broad investigation and survey of commercial conditions affecting American trade and industries. The Department of Commerce, it was stated, should more and more specialize through experts.

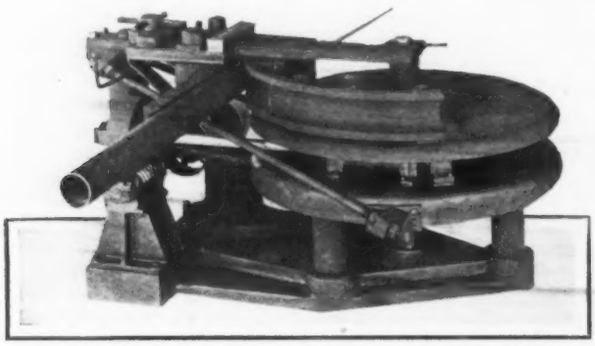
Mr. Hoover made request for $250,000 for the establishment of industrial divisions in the Bureau of Foreign and Domestic Commerce, to investigate in the

(*Continued on page* 1408)

Angle and Pipe Bending Machines

Two improved machines are being offered to the trade by the Wallace Supplies Mfg. Co., 412 Orleans Street, Chicago. They are the No. 8 power driven bending machine and the No. 14 pipe bending machine, here illustrated. Previous models were described in THE IRON AGE of July 15, 1920, page 134.

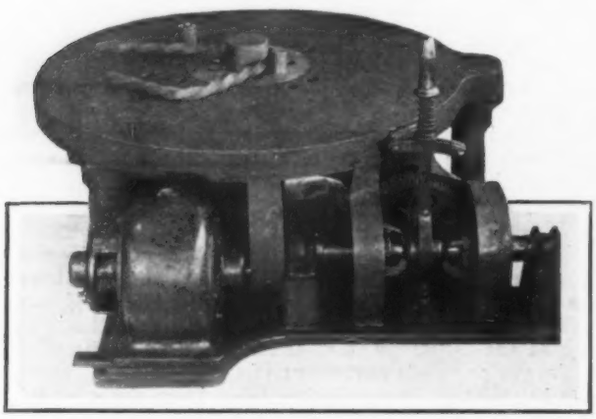
The No. 8 machine was designed primarily for bending reinforcement bars in large quantities, although it is adaptable to bending angle iron, channels, special sections and pipe or tubing. Square twisted reinforcement bars 1½ in. in diameter can be bent on the machine, or two 1¼ in. bars at one time or an equivalent in the smaller sizes of bars. Bars may be bent from right to left. The machine is arranged for belt or motor



No. 14 Machine for Bending Pipe. Special forms are used for bending light gage tubing to a short radius

drive, the motor required being 7½ hp. The approximate weight is 3500 lb., and floor space required is 6x6 ft.

The No. 14 machine was designed for bending standard iron pipe or tubing up to 4 in. pipe size, or 4.5 in., outside diameter. It is operated by a lever engaging friction clutch pulleys for forward and reverse drives. Adjustable stops are provided to suit any degree of bend required. The clutch is automatically thrown out at both the end of the bending operation and when the machine has been reversed to the starting position. The roller bracket is adjustable to take forms up to 48 in. in diameter and is operated with an eccentric lever to force the tube or pipe into the groove or the form for holding the outside bar close to the form. The pipe is secured to the form by means of a strap and an eccentric lever, and both the inside follower and the form are grooved.



No. 8 Machine for Bending Reinforcement Bars. It is also adaptable to bending of shapes, pipe and tubing

The outside follower bar operates between the tube and roller instead of working on the tube directly.

Six standard forms are furnished with the machine with which bends can be made cold without the use of an inside follower or floating mandrel. Special forms can be furnished to order for bending light gage tubing to a short radius without flattening or crimping. Special equipment can also be provided for bending shapes and special sections.

The weight of the machine is approximately 4000 lb. and the floor space occupied is 52x66 in.

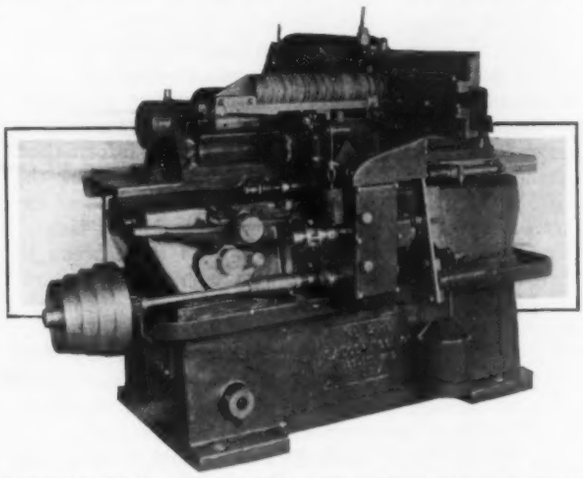
Piston Ring Grinder

The function of the No. 220 automatic piston ring grinder recently brought out by the Badger Tool Co., Beloit, Wis., is to rough grind the parallel sides of individually cast rings preparatory to finish grinding. It is adjustable to take rings from 2¾ to 4½ in. in diameter, ⅛ to ½ in. thick, and is furnished for either wet or dry grinding.

The average production of the machine is said to be 8000 rings per day, with a variation in any one ring not to exceed 0.003 in., and the low point on one ring to the high point on any other not to exceed 0.005 in. One man can operate two machines and the smaller size rings can be ground at a more rapid rate. Further claims include the elimination of warp or twist in the casting, reduction of breakage by a large percentage and minimum tendency of the grinding wheel to wear out of true because of the manner of passing the rings through the machine.

The hopper track holds one hundred 3¾x¼-in. ring castings and can be extended to receive 200, if desired. The column of rings is backed up by a pusher attached to a cable and weight. A reciprocating ram, driven by a cam, arm and weight, forces one ring at a time between two grinding wheels held in chucks. Guide bars above and below the ring are supported front and back. The grinding wheels are automatically opened as a ring enters at the front and at the same time a finished ring leaves at the back, falling into a chute and from thence into a box.

The ring castings are made to pass across the entire grinding face of the wheels, which are 18 in. in diameter with 5 in. center hole. The wheels are



Automatic Piston Ring Grinder Used Preparatory to Finish Grinding. A reciprocating ram, driven by a cam, arm and weight, forces one ring at a time between two grinding wheels held in chucks

brought together by means of a lever and weights, the pressure being increased by adding or removing weights furnished. A micrometer stop screw is located conveniently at the front. From tests made it has been found that this adjustment is not required more frequently than once every 3000 to 4000 rings, yet as in any other type of grinder, the frequency of compensating for wheel wear is largely dependent upon the character of the wheels used and the amount of metal being removed. A wheel truing attachment is furnished and the wheels can be dressed without disturbing the setting.

The countershaft has an extra cone pulley for driving the automatic parts of the machine and is also provided with a pulley for driving either a dust exhauster or a water pump. All moving parts are protected against dust or injury to the operator. The complete equipment weighs 4500 lbs., and 10 to 15 hp. is required for capacity operation.

The Wheeling Steel Corporation Building, Market Street, Wheeling, W. Va., formerly the Schmulbach Building, is being altered and cleaned up preparatory to the removal of the offices of all the various subsidiaries of the corporation to that building.

Ingot Defects and the Welding of Steel

Valuable Views Developed in an Iron and Steel Institute Discussion — Prevention of Hardening Cracks — Cleaning of Blast Furnace Gas

(Special Correspondence)

LONDON, ENGLAND, May 7.—The spring meeting of the Iron and Steel Institute was held on May 5 and 6 at the Institution of Civil Engineers. Dr. J. E. Stead, the president, was in the chair. The papers covered a wide range of subjects, but the discussions were rather below the usual standard. Presumably the anxieties of the present industrial crisis prevented many members from presenting their views at the meetings.

Members were pleased at the reappearance of Dr. Arnold, after his illness, and the latter had not been speaking for long before it became evident that he still retains those qualities as a debater which, in the past, have so frequently injected a certain liveliness into the proceedings. Investigators dealing with special steels will continue to read papers at their peril if they do not tacitly assume that the last word has already been said by Dr. Arnold.

Defects in Steel Ingots

A PAPER on "The Welding of Steel in Relation to the Occurrence of Pipe, Blowholes and Segregates in Ingots" by Harry Brearley provided valuable data on a subject of practical importance to the steelmaker.

The author observes that hot steel can be welded together under pressure at low temperatures in an atmosphere of hydrogen or other inert gas. Turnings sometimes stick to the cutting edge of tools which are doing heavy work, and it is on record that a cutting tool has been found welded to a heavy forging which was being machined.

The Effects of Scale

Steel oxidizes at comparatively low temperatures. The temper colors visible on bright steel heated up to 200 deg. C. and beyond are forms of iron oxide which, as the temperature is raised, pass gradually into the more or less adherent oxide of measurable thickness which we call scale. The scale thus formed is a brittle substance whether hot or cold; it is not malleable or plastic, and cannot be welded together. At very high temperatures the scale melts and could be expressed in the fluid condition from between two metallic surfaces, but the temperature at which it remains sufficiently fluid is near the melting point of steel. At such high temperatures the fluid oxide scale reacts with the carbon of the plastic steel, liberating carbon monoxide, or dioxide, which forms blisters. It is, therefore, not practicable to make a respectable weld without using some means of lowering the melting temperature of the scale, and also modifying its oxidizing effect on the hot steel.

In order to flux the scale which forms on heating iron and steel, the blacksmith uses sand. The sand-scale slag thus formed should be such as is fusible at temperatures some hundreds of degrees below the melting point of either the scale or the sand. Its fusibility varies with the respective proportions of scale and sand used. Too much of either constituent produces a less fusible flux. Since the amount of one of the constituents—the scale—cannot be determined, the most effective quantity of sand to use can be selected only by skilled judgment; it depends on the amount of scale needing to be fluxed, and the area to be covered by the fusible sheath which cleans the surfaces and shields them from further oxidation.

Variations in Welds

Being produced under empirical conditions which are so difficult to control, there is no wonder that welds apparently similar are really of varying quality. The best of them are never perfect, though statements to the contrary are frequently made. A weld may appear under certain test conditions to be stronger than the adjacent part, for two reasons: first, because the adjacent parts have been badly overheated and not hammered; and, second, because the welded part has been superficially carburized by the coke fire and to a corresponding extent that part has a higher tensile strength. Both these conditions are due to negligence, and hence, judging from the comparative behavior of welded and adjacent parts under the stress of a tensile test, we arrive at this amazing paradox—the less skilfully the welding is done the better the weld may appear to be.

How near to perfection a weld can be made is a question of great importance to steelmakers. Under rolling or forging conditions a steel may be unweldable and yet an ingot may be forged into sound bars. If, however, such an ingot be cracked, as more are than we like to admit, then it is not forgeable, but will crumble under the hammer. This explains why certain alloy steel ingots forge well, and others having the same composition not at all, or very badly.

Ingots are never quite free from shrinkage cavities, contraction cavities, cracks, or blowholes. Dr. Stead and others conclude from microscopic evidence that "the welding of blowhole cavities as a rule is complete and perfect." Their experimental evidence is obtained by boring a hole into an ingot or billet, fitting a plug of the same material, sealing the joint with a blowpipe, raising to welding heat and hammering or rolling into a bar. If the bar, when nicked and broken across the welded faces, show no signs of the weld, and the microscope evidence be satisfactory, it is assumed that the weld has been perfectly made.

If by perfection we mean a welded joining which is in all respects as good as any unwelded part of the same bar, then it may be said that the evidence is insufficient to support the conclusion even so far as the limited experimental conditions are concerned. The conclusions are a still less satisfactory answer to the question whether blowholes in ingots weld up because a drilled hole is smooth and clean, whereas a shrinkage cavity or blowhole may be uneven, lined with segregates, coated with alumina, or otherwise less favorably disposed to weld completely.

"Hair Lines" in War Steel

During the war great trouble was caused by the occurrence in aero-engine crankshafts of small cracks whose origin was camouflaged by calling them "hair-lines"; just as 10 or 20 years ago slag streaks were called "sand cracks" and many other names except slag. The so-called hair-lines arose mainly from ingot defects, notably those occurring in and about the axis of the ingot. These axial defects are the remnants of shrinkage taking place in the nearly solidified ingot. The small volume of impure metal last fluid moves downwards as best it may between the loosely adhering free crystals, filling up shrinkage and contraction cavities as long as it is hot enough, or impure enough, to keep fluid. It is finally frozen in positions, lying like an inverted cone about the axis of the ingot. It is called a "V" segregate because it can be detected by a sulphide print, but the harm lies in the small cavities themselves rather than in the sulphide segregate found in, or near, the cavities.

The "V" cavities are greater when an ingot is cast hot than they are when the same kind of ingot is cast cold. The remedy is to cast cold in a mold tapered as much as is practicable. The remedy, however, does not get rid entirely of the cavities, and one must reckon that the remnants of them may appear either as split centers, if the forging be carelessly done, or as small seams or "hair-lines," however skilfully the forging operation may be carried out.

Welding Chrome and Nickel Steels

It has been suggested that minute defects inherent in commercially sound ingots, and small blowholes which may occur accidentally, do not weld up in nickel-chromium steels, because steel containing chromium will not weld. And it has been said that if aero-crankshafts, and other important structural components, were made from nickel steels or, better still, from carbon steels, the greater weldability of these steels would remove all difficulties. When this idea is tested under conditions more favorable than those occurring in practice, i.e., by drilling holes along the axis of a bloom, inserting a machined bar of the same material, and after hermetically sealing the ends, rolling the bloom into a small bar, which is then nicked and broken, we arrive at very curious results. Some steels tested in this way were ordinary mild steels containing 0.15 per cent and 0.35 per cent carbon, a 3 per cent nickel steel, a 5 per cent nickel case-hardening steel, and a nickel-chromium steel, such as was used for aero-engine crankshafts. On etched transverse sections of the bars the weld lines were either not visible or slight indications only were discovered after much patient searching. When the bars were nicked and broken across the welded surfaces all the steels, judging from the fractures, appeared to have welded perfectly except the 0.15 per cent carbon steel and the 5 per cent nickel case-hardening steel. Unless, therefore, we are prepared to believe that tough mild steels weld less perfectly than nickel-chromium steel, we must question the reliability of both these methods of measuring the efficiency of a weld.

On hardening and reheating the entire series of steels so as to put all of them into a tough condition having Izod figures of over 50 ft.-lb., we find that not one of them withstands the nicked bar test; without exception they pull apart at the welded surfaces. These results explain clearly why transverse fractures of nickel steels appear to be more reedy than similar fractures made in ordinary carbon steel, i.e., the nickel steel is tougher and therefore pulls open on the faces of welded blowholes, or slag streaks, more than in the less tough carbon steels; the steel itself is not more reedy in the sense that it contains more slag streaks, or less perfectly welded blowholes.

It is obviously incorrect to say that steel containing chromium cannot be welded under such conditions as apply to the welding of cavities in ingots. If, however, we are seeking some means of expressing the extent to which such steels weld, as compared with ordinary carbon steel, we

should endeavor to state comparative results in concrete figures. No attempt appears to have been made to do this.

Investigation of Welds

The author then describes his own method of investigation. The steels are prepared as 3½-in. billets. A 1-in. diameter hole is drilled down the axis and a turned bar driven into it and fused over at each end. The cored billet is then rolled into a bar 4½ in. by ½ in. and impact test pieces cut from the side and center of this flat bar. The test piece cut from the center of the bar will require a somewhat greater force than in the test piece cut from the side to extend the crack across the specimen, depending on the perfection of the weld between the core and the inside of the hollow billet. If no welding has occurred the crack will come to a dead stop when it reaches the core or leaves it, and a new crack would need to be started in each case. This absorbs a great deal more energy than is required to propagate a crack which has already been started.

Comparative Welding Results

Experimenting on these lines, the author obtained comparative welding figures for four steels of varying composition. These figures represent in Izod foot-pounds the degree of toughness which must be induced in the steels by hardening and tempering in order to pull the welded surfaces apart into a visible gap.

How far the proposed method of testing welded surfaces, or determining the coefficient of welding, will be found reliable and useful must be shown by further experiment. It is clear, however, that all forms of plastic welding such as are used by the blacksmith, and such as operate in the rolling and forging of piped ingots, produce welded parts unlike other parts of the bar, inasmuch as the welded surfaces can be pulled open, and the free ferrite about them is quite abnormal.

The author's conditions for determining the coefficient of weldability are admittedly empirical, and he therefore experimented with other dimensions of cores. He concluded that, while useful information may be obtained whatever size of billet and bar is used, it is advisable to adhere to fixed sizes if the results are required to be strictly comparative. The author prefers to insert a core into the drilled billet, as then two welded surfaces occur in the impact test-piece.

It is pointed out that what may appear as a defect under one set of circumstances becomes an advantage under another.

In this respect we may observe that the degree of imperfection of welds is made manifest by a rise in the impact figure. Were no welding to take place the impact test specimen used would bring the testing machine to a dead stop, although the material was not in a very tough condition. If, therefore, the material of a piped ingot, or a blown ingot, be stressed transversely to the direction in which it has been elongated by forging or rolling, such stresses carried to the point of fracturing will have more work to do than under similar circumstances would be required to fracture such material made from a sound ingot. The plate of a laminated spring is one of the best examples of the truth of this deduction, and as a matter of experiment it is found that a cambered spring plate made from the top of a piped ingot cannot be broken by scragging as easily as a similar plate made from the bottom end of the same ingot. In this sense blown ingots, or those rich in non-metallic impurities, make good spring plates, and it is mainly on this account that Bessemer steel is preferred by many spring makers to the more carefully melted and cast open-hearth steel. To some extent the same advantages apply to straight axles, and they are worth consideration even in relation to rolled tires. It is very remarkable that the fabled virtue of all good wrought iron, viz., its fiber, should be regarded as a defect in steel. It should be valued of course like the grain in wood, according to its direction, in relation to the stresses put upon it.

Sulphur Too Much Blamed

There seems to be little doubt that sulphur has been blamed for defects due to other causes, and one wonders whether this segregate in particular is quite as harmful as it is made out to be. Take, for example, a piece of boiler plate which has laminated on flanging. The metallurgist applies a piece of acidified photo paper and produces a sulphur print showing that the defective part corresponds with a segregated area. According to text-books segregates are known to be harmful and high sulphur is reputed to cause red-shortness. The inference is easy, but the obvious explanation is, in many cases, not the correct one. It is true that sulphur compounds segregate in steel; so do phosphorus, and so also do carbon compounds. Of these the one most easily detectable, and almost invariably detected, by the method of sulphur printing is sulphur, but it is not therefore necessarily more culpable than either phosphorus or carbon. Further, in perfectly sound ingots (except perhaps very large ones) mass segregation is not possible. In such ingots as are practically sound, that is to say, in the best type of commercial ingots, mass segregates are found only where there are, or have been, cavities. The pipe in a piped ingot is lined with segregates and most cavities in a blown ingot are distinguishable in the forged blooms by the segregates which filled, or partly filled, the cavities in the ingot stage.

It would be something of a paradox if, presuming it could be entirely eliminated, sulphur were after all retained in, or purposely added to, steel in order to serve as witness. A sulphur print of an ingot section is one of the best records of the conditions under which an ingot is formed. It may indicate the casting temperature; whether top or bottom casting methods have been used; whether blowholes later filled up have existed earlier in the partly fluid ingot; and many other useful things to the observant investigator. It is by far the most valuable means available for determining whether a forging became axially unsound on hammering or was made from piped material. It indicates at once the presence of spot segregates in forged or machined articles, and either facilitates the machining or suggests that the material should be scrapped, and finally it is an indispensable touchstone for the careful steelmaker who is making steel for such special purposes as rifle barrels. In nearly every case a sulphur print is less valuable as an indication of sulphur than of more harmful things of which its presence gives warning. A sulphur print is worth many sulphur determinations, and we could hardly spare the tell-tale sulphur altogether—we might then have to add sulphur to our steel as we know nothing so voluble, so reliable, and so harmless which would serve the purpose equally well.

Discussion

Dr. J. E. Stead observed that the paper was based somewhat upon his own previous work, but the author had adopted better methods for determining whether cavities or blowholes in ingots welded up during working.

Dr. J. O. Arnold suggested that the author should come down to first principles before he dealt with details. An argument which would apply to one of the various types of segregates met with in steels would not apply to others. He agreed with the author that manganese sulphide was not likely to weld with steel. It always occurred in layers, but no serious breaking at the layers took place. How did the flakes of MnS act? He suggested the influence of surface tension in holding the flakes firmly in position and strongly attached to the iron or mild steel surrounding them.

H. Dodo suggested the term "yielding strength" in preference to tensile strength in discussing the strength of welds.

Dr. W. Rosenhain, National Physical Laboratory, Teddington, agreed with most of the author's contentions. The difficulty was that one could never tell when a weld was merely slightly imperfect or very bad. With regard to the influence of the segregates, he was sure that if it were not possible to press metal to metal a weld would not result. That was confirmed by the blacksmith's experience, when the fusible slag was squeezed out in making the weld. In the case of a blowhole there was no possibility of squeezing out the interfering substance and it was therefore mechanically difficult to get a perfect weld. The author had made a great advance in the methods of investigating welds, but Izod impact tests were likely to be very variable even in quite sound material. A large number of determinations should be made before making comparisons as to relative weldability. He thought we did not owe such a debt of gratitude to sulphur in steel as the author indicated, but he agreed that to read a sulphur print merely as an indication of the sulphur contents was to neglect nine-tenths of the valuable information it conveyed.

Dr. Leslie Aitchison pointed out the omission of tensile tests of the steels, which had always to be taken into account in evaluating Izod impact test results. If this were done for the steels mentioned in the paper he thought it would be found that the steels really welded to the same degree and not to different degrees as suggested. He further contended that the actual amount of sulphur would have no influence on the way in which the material would weld.

Welds in Air and Hydrogen Compared

J. H. Whiteley thought the author was not justified in drawing the conclusions he had done from his experiments because his welds were made in air. In blowholes the gases were always reducing and therefore the surfaces should always weld. He had made welds in hydrogen and air respectively, and microscopic examination showed no trace of junction in the hydrogen welds, but junctions could be detected in the air welds. Other experiments confirmed this, applying the author's own test to the welds. He had taken a bar of mild

steel (0.24 per cent carbon), bored at one end to form a closed tube, and inserted a plug of the same steel about 2 in. long, the plug being split longitudinally to make three welds in all. That plug was welded in dry hydrogen. A similar plug was welded in air, and the original piece was forged down to ½ in. square, the same size as the welded bars. The specimens were then quenched in oil, like the author's, at 900 deg. C., tempered at 550 to 570 deg. C., and impact tested in duplicate with the following results:

Unwelded bars	97 and 95 ft.-lb.
Hydrogen welds	107 and 103 ft.-lb.
Air welds	110 and 113 ft.-lb.

The fractures of the hydrogen welded bars were the same as the unwelded bar, and the welds did not strip, but traces of the air welds could be seen in the fractures. Under the microscope there was no trace of the hydrogen weld, but the air weld was visible. He therefore still maintained that under the right conditions the steel could be welded perfectly. He ascribed the author's results partly to the fact that, by fusing the ends of his cylinders, he had hermetically sealed the gas. This, being unable to escape, would produce sponginess which would account for the stripping obtained by the author in his tests.

Dr. W. H. Hatfield said the author had raised two essential points: (1) whether pipes, blowholes, and segregates would weld up, and (2) the influence of the sulphur and phosphorus segregates on the useful qualities of the steel. The author's evidence proved that cavities did not weld up satisfactorily and that it was essential for the ingots to be free from internal defects. He recommended the use of an inverted ingot with a good refractory head. He did not agree that sulphur should be carried as high as the author had suggested. Obviously manganese sulphide was a brittle substance and should be kept as low as possible. He deprecated the author's suggestion that for spring steels and the like ingots high in impurities might be used.

Sir William H. Ellis referred to his past experience with compressed ingots, as used for large work. He had found that perfect welding was possible if there were an absence of access for oxygen.

Dr. Andrew McWilliam pointed out that if an ingot were made with the right number of blowholes in it, there would be a reducing atmosphere in the cavities, but with a so-called "cauliflower top" oxygen would be absorbed from the air. As regards what became of the gas, he used to teach that it was reabsorbed in the process of working up, and the examination of specimens seemed to confirm that view.

Col. David Carnegie recalled troubles with shell ingots in Canada during the war. These showed "furriness" on longitudinal fracture, which was due to contraction troubles rather than blowholes. He wished to know how far it was possible to discriminate between an ingot where blowholes were likely to interfere with the welding and where welding up was possible.

Cosmo Johns complained that the author had not given a summary of the conclusions on which he laid most stress. Steels containing cavities might be divided into three classes: (1) mild steels, such as for tinplate bars, in which the blowholes were practically always welded up; (2) high tensile carbon steels in which it had been found from experience that blowholes were undesirable, and a sound ingot was always aimed at; (3) alloy or special steels, which were treated and used under quite different conditions. No dogmatic statement regarding welds could be made to cover all these cases. The so-called perfect ingot of inverted shape was, to his knowledge, used in the early days of the Siemens process at Landore and is used throughout South Wales to-day for mild steels. Theoretically steel could be perfectly welded if the surfaces were absolutely clean, but the difficulty was to obtain this condition in practice in the hidden cavities. Another important point was the question of hair-lines, which appeared to be giving particular trouble to our friends across the Herring Pond. He suggested a symposium on the whole subject.

E. H. Saniter said nearly every speaker had accused the author of saying that a blowhole would not weld up. What he had said was that a blowhole would not weld up perfectly, which was a different thing. In practice, blowholes do weld up and probably 80 per cent of the steels used in Great Britain had blowholes which had welded up, and such steels served their purposes with every success.

C. H. Ridsdale pointed out that in many steels sulphur and phosphorus occur in a harmless condition separated out from the mass.

J. E. Fletcher thought the incomplete welding in the author's experiments was due to the extruding action of rolling on the centers of the bars. This also accounted for the ferrite line on the etched micro. of a weld shown in the paper.

J. C. W. Humfrey referred to hair-line cracks in nickel-chrome steels. He had examined large numbers of specimens, and in no case was there any evidence that they were originally ingot defects, as suggested by the author. He suggested a slow method of notched-bar testing instead of the Izod test for welds.

Cleaning Blast Furnace Gas

S. H. FOWLES, of Jarrow-on-Tyne, is responsible for a valuable paper entitled "Notes on the Cleaning of Blast-Furnace Gas." It describes a plant of the Halberg-Beth type erected at Palmer's Shipbuilding & Iron Co.'s works in the early years of the war under very trying circumstances, when material and labor were hard to obtain. Within about 18 months this plant was put into operation. It was estimated to be capable of cleaning gas to develop about 27,000 hp. from crude waste gas. It ran continuously for another 18 mo. with 20 or 30 per cent overload.

In 1913-14 the first German gas-cleaning plants were being installed in this country. At the outbreak of war they were still unfinished, and the departure of the German engineers engaged on the works left the latter without the data and guidance necessary for the successful completion and operation of the plants. In these circumstances the work had to be carried out with great caution: much of the original theory had to be discarded and fresh theories evolved from data obtained under actual working conditions, in spite of velocity and quantity of gas being high and changeable. For the data showing the variations found desirable in adapting the process to conditions at Jarrow, the original paper should be consulted. It will suffice, in order to follow the discussion, to reproduce in part the author's summary hereunder:

> To use the gas under boilers, whether from coke-ovens or blast-furnaces, is a barbarous practice. Therefore we must cultivate the internal combustion engine.
>
> This means that the crux of the whole business rests with the gas-cleaning plant, which has been proved beyond doubt to be the case.
>
> Gas-cleaning plants for cleaning blast-furnace gas are of several types: 1. The wet process. 2. The dry process. 3. The electrostatic process.

The dry process is neither a "dry hot" nor a "cold wet" process but stands between the two. It is moderate in first cost, economical to maintain, easy to operate, and flexible in respect to furnace operation. It gives a clean dry gas for the engines, and a clean dry gas of reasonable temperature for stoves and industrial heating.

The author considers blast-furnace and coke-oven owners should be encouraged by engineers to work for a maximum efficiency on the stoves and a maximum surplus of gas for the generation of power, which would thus become a great national source of cheap energy.

Discussion

A. Lennox Leigh said one of the objections to the type of apparatus described was the initial capital cost and also the running cost due to replacing the clean-

ing bags. He had experimented with the use of asbestos fabric for the bags, which would reduce the renewals and dispense with the pre-cooling plant. The experiments were quite successful although the process was not yet adopted on a commercial scale. It was quite as easy to weave the asbestos to any degree of fineness desired as in the case of cotton fabric.

Alfred Hutchinson agreed that Mr. Leigh's suggestion showed great promise. He disagreed with the author's statement that the running costs and power consumption of the electrostatic type of cleaner were unduly high. The power consumption was exceptionally low and the capital cost lower than that of the other process, which was the chief reason why he had adopted the electrostatic process at Skinningrove.

H. M. Ridge said no doubt the question of cooling was the chief trouble with the Halberg-Beth plant, but it was significant that the Lorraine and Luxemburg works still preferred this type, although some of these works had cold, moisture-laden gas to deal with, and therefore had no cooling to do. In many cases it was actually found necessary to heat the gas, the temperature being raised in one instance by about 50 deg. C., for which a good deal of coal was burned. He disagreed with the author on boiler-firing, holding that when used for stoves or boilers it was desirable to have the gas at a high temperature. Gas-cleaning was of vital importance for the generation of cheap power, and if all British blast-furnace plants adopted modern gas-cleaning methods a large amount of surplus gas would be made available for power supply to the neighborhood of the plants. In Lorraine the cleaned blast-furnace gas at many works not only supplied power for their own requirements but sold a substantial surplus for lighting adjoining villages and supplying power to adjoining works at a remarkably low cost. He suggested a symposium on this nationally important subject.

F. W. Harbord pointed out that for some years to come many works would not have gas engines. They had existing plant which they could not afford to scrap. What was needed was better and cheaper gas-cleaning for general works purposes. He suggested that the simple cyclone type of cleaner should be developed in a scientific way. In other metallurgical works it had dealt very successfully with dust much finer than that obtained from blast furnaces, and the cost would be a matter of hundreds of pounds sterling against thousands.

G. W. Hewson said Continental practice had shown that 30 per cent of the gas was required for stoves and boilers, leaving roughly 70 per cent for engine purposes.

That being so, it was better to clean the whole of the gas down to 0.005 gram per cubic meter, as required for the engines. This would give greater flexibility to meet varying demands of the stoves, boilers, and engines. It was important to eliminate the heavy dust as soon as possible after leaving the furnace, and to leave only the fine dust for the cleaners. In some works economizers were used, but he thought large diameter coolers were far preferable.

L. Rothera said the only way to make the power balance in a modern steel works was to use the gas in the most efficient way, and as much as possible should be converted into electricity. In the near future it would be considered quite wrong to use the gas for burning under boilers when gas engines were available.

G. B. Garrett suggested a system for rough-cleaning all the gas, and then to pass through a fine cleaner only the gas required for the engines. In the United States, with large modern boilers, hot clean gas, clean water, and pre-heated air, a boiler efficiency of over 80 per cent could be obtained. At one plant they were getting 150 to 200 per cent rating out of the existing boilers by the use of blast-furnace gas alone. In a recent report by the chief engineer of the Ohio plant of the Carnegie Steel Co., the installation was recommended of steam-driven plant, raising steam at 300 to 350 lb. pressure and about 200 deg. superheat, running it through high pressure turbines exhausting at about 180 lb. and 100 deg. superheat for further use in steam engines and turbines.

The author intimated that he would reply to the discussion in writing.

The following two papers were discussed together:

Cause and Prevention of Hardening Cracks

SHIPLEY N. BRAYSHAW, of Manchester, presented a lengthy paper, recording the results of an immense amount of work, entitled "The Prevention of Hardening Cracks and the Effect of Controlling Recalescence in a Tungsten Tool Steel."

The paper describes a research carried out on a tool steel containing about 1.1 per cent of carbon and 0.8 to 0.9 per cent of tungsten. A large number of bars, after soaking for various periods of time at temperatures near the critical points, were quenched in water. A second series of bars, similarly heat-treated, was cooled in sand instead of being water-quenched. All these sand-cooled bars were finally hardened by one standard process. These bars lengthened or shortened on hardening, in response to the maximum temperature of the previous annealing, and to the progress that had been made in the slow recalescence during that annealing. The behavior of the hardened bars under bending stress was also found to have been determined by the heat treatment prior to the hardening.

The tendency of the steel to crack in hardening was correlated to the various results from the bars by means of a series of milling cutters purposely made of a design extremely difficult to harden. The milling cutters were machined out of blanks which had been heat-treated along with the bars. After the machining, the cutters all underwent the same standard hardening without any intervening process. The resulting cracks were found to occur in reasonable sequence with the treatment and with the results from the bars. When sufficient time was allowed for the heat treatment, within a certain range of temperature, the steel reached a condition in which the liability to crack in hardening was greatly reduced.

The following also are some of the matters arising out of the research. There was a remarkable uniformity in the modulus of elasticity of the hardened bars which differed greatly in other respects. Cutters which broke badly in hardening were generally made from blanks in which the ratio of the Brinell figure to the Shore figure was comparatively high. Progressive changes in length on successive days after hardening are referred to.

The Cause of Quenching Cracks

Under the above title Kôtarô Honda and two collaborators communicated the results of research work carried out at the Tohoku Imperial University, Japan, from which they arrived at the following conclusions:

1. In a quenched steel a certain amount of austenite is generally present intermingled in martensite. The amount of this austenite increases as the quenching temperature increases.

2. In small pieces of steel the periphery is harder than the central portion only when the quenching is very soft. In a moderate quenching the hardness is everywhere nearly equal, but in a hard quenching the periphery is always softer than the interior. This anomalous phenomenon is explained by the presence of the arrested austenite in martensite.

3. The quenching cracks in small pieces of steel occur when the hardness in the central portion is much greater than in the periphery. The cause of the cracking is attributed to the stress caused by the difference in the specific volumes of austenite and martensite; the specific volume of the former structure being much smaller than that of the latter the central portion exerts a large tangential tension on the periphery, causing thereby the cracking of the specimen.

4. Since the difference in the specific volumes increases as the temperature falls, the cracking usually takes place when the temperature of the quenched specimen approaches room temperature.

5. In a hard quenching, the hardness generally increases with the lapse of time, owing to a gradual transformation of the arrested austenite into martensite.

6. In the case of a large specimen, cracking may take place in the A1 range, and also in the vicinity of room temperature. The cracking at the high temperature is chiefly caused by the stress due to the structural difference between the inner and outer portions—pearlite and austenite—just below the A1 point; that at room temperature is due to a similar stress as in the small specimens.

Discussion

Dr. W. H. Hatfield said the hardening of such complicated articles as shown by Mr. Brayshaw was very difficult if cracks were to be avoided. He had followed the work and could confirm the statements made, although theoretical explanations were not easy at present. He emphasized the important fact that the Shore value did not bear a constant ratio to the Brinell, and would like to know the reason. As regards Professor Honda's paper, he found it difficult to agree with conclusion 1. He thought all the original austenite would have disappeared when the steel reached ordinary temperatures.

Dr. J. O. Arnold said trouble usually arose when

engineers attempted to read metallurgical papers to metallurgists. He contended that the author's steel was not, properly speaking, a tungsten steel, as the tungsten was quite low. It was a steel containing tungsten. He could not class the paper as one of any special value to metallurgists. He thought Brinell figures were absolutely useless for tool steel. Under a lathe test he had found that a plain carbon steel of higher Brinell hardness than a tool steel ran only one minute while the tool steel ran 16 min.

Harry Brearley thought that the 0.8 per cent of tungsten, referred to by Dr. Arnold as low, had an important influence on the quality of this class of steel from the point of view of the practical hardener. The author gave no information regarding his original ingots, or how they were forged, and there was no assurance that the material was uniform. He advocated heating up complicated tools slowly from cold instead of using the salt bath.

Mr. Brayshaw said he would reply to the discussion in writing, following the example set by previous authors. It would be a pity, in the reporter's opinion at least, if this becomes a habit, for a brief reply to the chief points raised rounds off a good discussion, and an author can always amplify his reply in writing.

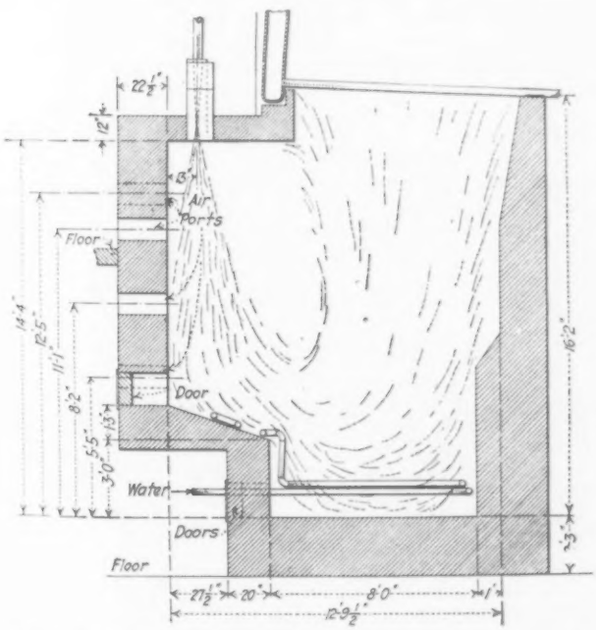
Limitations of space prevent an account of the other papers and discussions, but mention may be made of Cosmo Johns's remarks on Dr. Stead's and Mr. Whiteley's papers. He observed that it was now no longer possible for anybody merely to assert that they did not believe oxygen was soluble in steel; for the onus of proof was now on them. No one had yet satisfactorily explained, he continued, why basic steel gave lower tensile tests than acid steel of the same quality, but it might be due to the higher oxygen content of the former. Other papers presented were as follows:

J. E. Fletcher: Blast Furnace and Cupola Slags.
J. Newton Friend: The Protection of Iron with Paint Against Atmospheric Corrosion.
W. E. Hughes: Slip Lines and Twinning in Electro-Deposited Iron.
H. T. Ringrose: Scientific Control of Combustion.
T. E. Rooney: Comparison of Different Methods of Estimating Su'phur in Steel.
J. H. Whiteley: Cupric Etching Effects Produced by Phosphorus and Oxygen in Iron.
J. E. Stead: Solid Solution of Oxygen in Iron.
Arne Westgren: Roentgen Spectrographic Investigations of Iron and Steel.

Boiler Tests with Pulverized Coal

Results of tests to determine overall efficiency of pulverized Illinois coal burned in steam boilers under various conditions of furnace operation and different preparation of coal as to degree of fineness and percentage of moisure are discussed by engineers of the fuel section of the United States Bureau of Mines and the research department of the Combustion Engineering Corporation, in a paper to be read at the spring meeting of the American Society of Mechanical Engineers at Chicago.

The eleven tests were made on a 468-hp. Edgemoor



Boiler Furnace Arranged for Burning Powdered Coal with a Cooling Coil Over Hearth

water-tube boiler, equipped with a Foster superheater, at the Oneida Street station of the Milwaukee Electric Railway & Light Co., Milwaukee. The powdered coal equipment was designed and installed by the Locomotive Pulverized Fuel Co.

The first three tests were made with the usual preparation of coal and under ordinary operating conditions; the fourth, with the same condition of coal as the three previous tests, but with the furnace provided with a cooling coil over the hearth and along the walls near the bottom of the furnace to facilitate the removal of ash. The next four tests were made with the cooling coil arrangement but with the coal pulverized to a less degree of fineness. The last three tests were made with the same furnace arrangement but with undried coal.

Interest centers on the degree of fineness of the pulverized coal, as ability to use relatively coarse coal means increased capacity of the pulverizing mills and decreased cost of coal preparation. It has been customary to state that in order to get good results the coal must be pulverized to a fineness sufficient to pass 95 per cent through a 100-mesh screen and 85 per cent through a 200-mesh screen. The following table of results of sizing tests of coal burned in the last four tests shows percentage of coal passing through screens:

20-Mesh	40-Mesh	100-Mesh	200-Mesh
99.9	99.2	93.2	67.0
99.9	99.2	93.1	70.1
100.0	98.9	90.8	65.5
99.8	98.0	88.6	64.0

The coal was much coarser than specified. The tests seem to indicate that it is not necessary to have coal of the extreme fineness of 85 per cent through a 200-mesh screen. The completeness of combustion seems to be more a matter of proper furnace and burner design and the proper method of supplying air. The losses due to coarseness of coal would be shown by the greater percentage of carbon in the refuse. The average loss due to this cause for the four tests with the coarse coal is 0.7 per cent. The average of this loss for the previous four tests is 0.6 per cent.

The tests also developed that it is not necessary to dry coal to about 1 per cent moisture in order to burn it successfully in pulverized form and it was found that with most Eastern coals drying is not necessary.

Good results can be obtained when the coal is burned at rates varying from 0.5 lb. to 2 lb. per cu. ft. of combustion space per hour and the best results at a rate of 1 to 1.5 lb.

Railroad Wage Reduction Will Be 10 to 15 Per Cent

CHICAGO, May 24.—The rates of pay and classifications established by the Railroad Labor Board's wage award of July, 1920, will be used as the basis of reductions when the board issues its wage decision on June 1, it was learned at Chicago late Tuesday afternoon. After a week's deliberation the board has arrived at tentative percentages which will cut the present rates from 10 to 15 per cent, according to the class of employees affected. No estimate of the number of employees affected nor total size of cut has been made, but in railroad circles the reduction is placed at between $350,000,000 and $400,000,000.

MECHANICAL ENGINEERS

Officers Nominated—Tuesday's Sessions of Spring Meeting at Chicago

CHICAGO, May 24.—The American Society of Mechanical Engineers convened in its spring meeting at the Congress Hotel, Chicago, on May 23 for a four day session. At 2 p. m. on May 24 the registration totaled 914, of which 309 were guests, a figure which is considerably in excess of the total registration for the spring meeting of last year at St. Louis.

Officers Nominated for Next Year

A nominating committee at a meeting on the first day selected nominees for officers for the coming year as follows:

President, Dexter S. Kimball, dean of schools of engineering, Cornell University, Ithaca, N. Y.

Vice-presidents, to serve three years: Col. E. A. Deeds, president Dayton Engineering Co., Dayton, Ohio; Robert Sibley, editor *Journal of Electricity*, San Francisco; L. E. Strothman, vice-president and general manager Richardson-Phoenix Co., Milwaukee.

Managers for three years: Sherwood F. Jeter, chief engineer Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.; Horace P. Liversidge, assistant chief engineer Philadelphia Electric Co., Philadelphia; Hollis P. Porter, superintendent gas department Gypsy Oil Co., Tulsa, Okla.

Manager to fill unexpired term of Dean Kimball, W. S. Finlay, Jr., New York.

Treasurer, William H. Wiley, John Wiley & Sons, Inc., New York.

For members of American Engineering Council for two years: Francis Blossom, Sanderson & Porter, engineers, New York; Charles A. Booth, vice-president and sales manager, Buffalo Forge Co., N. Y.; Gano Dunn, president J. G. White Engineering Corporation, New York; H. H. Esselstyn, president Esselstyn, Murphy & Hanford, Detroit; W. S. Lee, chief engineer Southern Power Co., Charlotte, N. C.; Irving E. Moultrop, assistant superintendent construction bureau, Edison Electric Illuminating Co. of Boston; John A. Stevens, consulting engineer, Lowell, Mass.; A. E. Walden, chief engineer and superintendent Baltimore County Water & Electric Co., Baltimore; Perley F. Walker, dean School of Engineering, University of Kansas, Lawrence, Kan.

High Boiler Efficiency with Powdered Coal

A meeting of the fuel section was held on Tuesday morning under the chairmanship of Joseph Harrington, vice-president James A. Brady Foundry Co., Chicago. All of the papers were read, following which there was 60 min. of discussion. Henry Kreisinger, fuel engineer United States Bureau of Mines, Pittsburgh, offered some data supplementary to those contained in the paper which he prepared jointly with John Blizard and which appears elsewhere in this issue. He stated that in a recent test he secured 90 per cent combined efficiency with powdered coal, with 16 per cent of the carbon dioxide at the damper of the boiler and 13 per cent at the exit of the economizer. In a series of tests in which the above results were obtained the combined overall efficiency ranged from 87½ to 90 per cent, while from 100 to 160 per cent of the rating of the boiler was secured.

Edward N. Trump, vice-president Solvay Process Co., Syracuse, N. Y., stated that a whole power plant had been operated with mechanical stokers at as high as 87 per cent of overall efficiency. John A. Stevens asserted that he found it an economy to bleed a turbine, taking some of the steam from the lower stages and taking that heat to preheat combustion air. In commenting on Mr. Stevens' experience, Mr. Kreisinger said that in the tests which he had just cited air had been preheated for combustion from 300 to 700 deg. Fahr., and that was one reason why such extraordinary efficiency was shown. He stated that a gain of 3 per cent in overall boiler efficiency was obtained for every 180 deg. rise in the temperature of the air.

R. Sanford Riley, president Sanford Riley Stoker Co., Worcester, Mass., called attention to the fact that discussion was being confined to efficiency tests and that costs had not been mentioned; that if interest on the investment were given proper weight the attractiveness of the methods mentioned might be reduced materially.

Effect of Automobile on Machine Tool

The section on machine shop practice met simultaneously with the fuel section, the presiding officer being F. O. Hoagland, vice-president and works manager Bilton Machine Tool Co., Bridgeport, Conn. Four of the papers presented had to do with the influence of the automobile on the machine tool industry and the fifth, entitled "Fundamentals of Interchangeable Manufacture," was presented by the author, C. B. Lord, works manager Advance Rumely Co., Battle Creek, Mich. A paper on the influence of the automobile on the machine tool industry in general, written by F. K. Hendrickson, Reed-Prentiss Co., Worcester, Mass., was read by Forrest E. Cardullo, chief engineer C. A. Gray Co., Cincinnati. Luther D. Burlingame, industrial superintendent, Brown & Sharpe Mfg. Co., Providence, R. I., read a written discussion of Mr. Hendrickson's paper. He pointed out that the influence of the automobile industry was not only to be noted in the machine tools directly used in automobile production but also in the gages and tool equipment required in the interests of accuracy and precision. He also mentioned grinding machinery as a type of equipment which had been developed rapidly under the impetus of the demands of the motor output. Without grinding machines, he said, it is doubtful whether the automobile industry would be commercially possible. He asserted that hardened gears, curved tooth and bevel gears and worm gear drives have all been brought out and developed because of the demands of the motor industry.

Another written discussion was read by Sol Einstein, chief designer, Cincinnati Milling Machine Co. He showed how automobile work influenced the design of milling machines and how it resulted in bringing out automatic feeds and intermittent feeds and returns on milling machines first developed by his company in 1910.

In commenting on Mr. Hendrickson's paper, J. A. Smith, general superintendent General Electric Co., Schenectady, N. Y., stated that there is an increasing demand for strength, power and speed in machine tools and for better quality and durability of the materials of which the machines are made. Precision and specialization in machine work brought to the fore by the automobile industry are possible to a greater degree in shops doing work involving little variety.

Lubrication Problem of Machine Tools

Mr. Smith laid particular emphasis upon lubrication, contending that machine tool builders are less up to date in matters of lubrication than in other particulars. It has been the experience of the General Electric Co., he said, that the majority of machine tool repairs are due to lack of lubrication. He attributed this to the fact that many oil holes are difficult to find and machine operators often forget to take care of the oiling. In a shop where duties are specialized he said it is not possible to induce workers to give the same attention to oiling that is given by the old-time all-round machinist. He asserted that machine tool designers should provide larger and more easily accessible holes and should reduce the number of the holes.

Mr. Lord asserted that from a manufacturing standpoint specialized tools, in the sense that they can perform numerous operations, are not wanted. The machine of the future he asserted will not be a complex machine doing multiple operations, but a simple machine doing a multiplicity of one operation, or in other words getting out a maximum output of one kind of product. He asserted that too many feeds and speeds are objectionable because they provide too many ways of getting out of order.

In commenting on the subject of lubrication brought

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Progress of Readjustment

Every industrial depression represents in a general sense a readjustment of conditions to a basis enabling business to proceed. The present depression is marked by a clearer and more widespread recognition of what is requisite in readjustment than usually obtains. The great majority of thinking men believe that the principal thing needed is readjustment in commodity prices and wage rates to a fair and harmonious basis. The harmonious feature is important. It is not sufficient that the average price of a thousand feet of lumber and a thousand brick be fair; each commodity must be at a fair price. Nor is it sufficient that the average price of a day's work with pick and shovel and a day's work at bricklaying be fair; each job's pay must be fair. There are some other things needed for a resumption of business activity, but they will probably take care of themselves soon enough. The Federal Reserve ratio has been rising and promises soon to be at a satisfactory level. Tax matters have been taken up at Washington.

In the case of both commodities and wages there are wide discrepancies at the moment, so that the need for the higher rates to come down is made the more apparent. Inasmuch as the common view is that these things need to be adjusted, and the situation is known from day to day, it is possible to measure the progress of the readjustment. In previous industrial depressions it has been difficult for most men to see the end, the revival having made considerable progress before it was commonly recognized as a substantial one. The same difficulty should not be encountered this time.

There is no difficulty, for instance, in reading some signs of the times from the monthly report of the Bureau of Labor Statistics of the Department of Labor on wholesale prices in April. It shows that, taking 1913 average prices as 100, farm products stood at 115 while housefurnishing goods stood at 274. The farmer would have to sell 2.38 times as much of his goods to get the same quantity of house furnishings as in 1913, or he would get 42 per cent as much for the same quantity of the things he sells. Naturally the farmer refuses to do business on that basis. Men may also readily draw their own conclusions from observing that commodities in general are set at 154 while building materials are set at 203. A decline in building materials is awaited. They are 32 per cent above the average, but in April, 1920, they were 29 per cent above the average. They stood then at 341 while commodities in general stood at 265. They have declined in a year, but not as rapidly as other commodities.

Before the war there were many crafts the workmen in which did well if they received twice as much pay hour as common labor. Now there is common labor seeking employment at 30 cents an hour while many craftsmen, as in the building trades, are refusing to work for less than three or four times as much. The public cannot be convinced that the war could or did justify such a change in the ratio.

A chief merit of this comparative method in studying commodity prices and wage rates lies in the fact that it eliminates the factor of change in the value of the dollar introduced by war and post-war conditions. At the outset of the readjustment men did not know to what level prices in general and wages in general needed to fall. Even now they do not know and it is not requisite that they should know. There is a growing collection of facts upon which judgment may be based as to the progress of the readjustment, the facts are a matter of common knowledge and they can easily be compared.

The announcement in THE IRON AGE last week that a number of Central Western steel companies will be represented at the International Trade Conference to be held in Mexico City in June calls attention not only to the more stable conditions which prevail in that country under the new government but also to the importance of Mexico as a buyer of American products. The export sales manager of a large independent Pittsburgh steel company is quoted as saying that Mexico offers a more promising field for foreign trade than many of the other countries that are usually considered in this connection. Statistics show that in 1920 Mexico took 160,496 gross tons of American finished steel, so far as classified, or nearly twice as much as in 1919. In 1913 these exports to Mexico were much less. Cast and wrought pipes and fittings made up the major portion last year, with structural steel, steel rails,

steel plates and galvanized sheets following in the order named. While steel exports to Mexico have been small compared with those to some other countries on the south, there is a wide field for expansion in all lines. Oil and mining have a bright future which will mean purchases of pipe and fittings as well as the building of railroads. With only two small steel plants in her borders Mexico must turn to outside sources for much of her needs.

Statistics and the War

In trying to solve problems connected with the present period of business depression, students of economics and of general business conditions are developing some interesting statistics. For example, a highly esteemed reader of THE IRON AGE writes as follows in regard to farm products and the price of pig iron:

> On April 1, the index figure of farm products was materially lower than the average on April 1 of the past ten years. The National City Bank's trade and industrial review for May cites this concrete instance of the farmer's present plight and contrasts it with the relatively high levels still maintained on manufactured products, fuel and transportation, where wages have not been reduced, arguing that the fundamental difficulty to-day is the dislocation of exchange relations between our industries—"the disruption of the price level between raw materials and manufactured goods." Prices on farm products have been liquidated and the reduced return to the farmer buys only a reduced volume in those lines which have been liquidated only partly or not at all.
>
> Pig iron to-day is on much the same basis as farm products. It has not reached pre-war levels and will not as long as it is inflated by war-time wages in its fuel and higher than war-time freights. Nevertheless it is a fact that pig iron, as with farm products, is now *materially lower than the average for the past ten years*. Valley Bessemer, based on the Snyder compilation of actual sales, shows an average for the ten-year period, 1911-1920 inclusive, of $24.85. THE IRON AGE, May 12, 1921, quoted $24. On Valley basic the ten-year average is $22.97, which compares with $22, quoted in the same May 12 issue. Similarly foundry and malleable grades, which have a more or less fixed relation to Bessemer and basic, are now selling below the ten-year average. These figures, coupled with the fact that to-day's prices average at least 50 per cent below the peak of last October, indicate that pig iron has been liquidated to a far greater extent than is commonly recognized.

The facts above stated as to pig iron prices considered in connection with the high cost of transportation and high wages, have value, but are not as impressive as they would be if based on a period that did not include the war, which sent prices to abnormally high levels. It is impossible to derive any law or even draw any definite conclusion from statistics covering a period which involved a cataclysm. This fact is also illustrated by efforts which are being made to estimate the probable production of pig iron. An article in the New York *Evening Post* of May 21 gives the statistics of pig iron production for the five years beginning 1914, the total being 170,200,000 tons, and then presents the statistics for 1919 and 1920 with estimates for 1921 and the two succeeding years, making the total for the second five-year period 169,400,000 tons. The estimates for the three years are 24,000,000 tons in 1921, 38,000,000 tons in 1922 and 40,500,000 tons in 1923. If the author had taken two earlier periods of five years, he would have found that in the period 1904 to 1908, both inclusive, the production was only 106,513,983 tons or an average of 21,302,797 tons and for the period from 1909 to 1913, both inclusive, the total production was 137,441,674 tons, or an average per year of 27,488,335 tons. In the normal growth of pig iron consumption, a larger production would naturally be expected for the five years beginning with 1919 than for the five years beginning 1909; but in view of the very poor showing certain to be made by the present year, it seems too much to hope that the five-year period ending with 1923 will witness a production nearly as great as that of the period beginning with 1914. The stimulus of the war was felt almost as much on production as on prices and the *Post* estimate calls for a larger output in 1922 and 1923 than in 1917 and 1918, the last two years of the war.

Unpopular Labor Unions

Labor leaders would have it that there is a conspiracy by men of wealth to introduce the non-union shop. They say in substance that "the open shop" is a lie, the thing the term is used for being really a non-union shop, and they smart from observing the growing popularity of the thing, whatever it may be called.

The thing, however it ought to be designated, involves chiefly three factors: Freedom from union wage rates, freedom from union slackness of performance and freedom from union restrictions. The friends of this free style of working claim it is growing in popularity, and the friends of the labor unions virtually admit the same thing, so that it may be taken for granted.

The question then is, Why? Between 10 and 15 per cent of the workers of the country belong to labor unions and between 85 and 90 per cent do not. It is far from certain that all of the 10 or 15 per cent are glad that they belong to labor unions. Men can be found who admit they would prefer an open shop or non-union condition and state that a situation has been created in their line whereby it is necessary for them to have a union card in order to hold a job. It is quite certain that the 85 or 90 per cent that do not belong to labor unions do not wish to belong.

Broadly speaking, then, it is a question of the judgment or opinion of 85 or 90 per cent of the workers formed as to the views or practices of the other 10 or 15 per cent. The opinion or judgment must be formed upon three things—the union wage rates, the union rates of performance and the union restrictions. Non-union workers can hardly find fault with union wages being reasonably high, but if the union wages are unreasonably high they can see that the union workers are profiting at the expense of non-union workers, and that it would be economically impossible for 100 per cent of the workers to be paid unreasonably high wages. That can be done only in the case of the few at the expense of the many.

As to union slacking, men doing less than a fair day's work for a day's pay, the average worker wishes to get on in life and realizes that the better the work he does the faster he will get

on. Naturally he does not sympathize with the man who uses force to restrain his employer from expecting more work from him and resigns himself to the idea of being all his life simply one description of artisan.

As to union restrictions the average worker does not see how it can be reasonable to subdivide work so that one artisan may not do a certain thing because the union has prescribed it as the work of another craft. Even the office boy is likely to see that if there were an arrangement whereby one office boy were employed to lick the envelopes, another to lick the stamps and a third to stick them together the rate of pay per office boy would likely be less.

The farmers constitute a very respectable percentage of the total number of workers, and the farmers have always disapproved more or less of labor unions. Of late their disapproval has been very strong, for the average farmer believes that the high cost of the things he buys is due largely to the labor unions. It is no wicked conspiracy of open shop advocates that has put the farmer in this frame of mind. Perhaps the alleged conspirators have given the farmer some facts as to what labor unions do and refuse to do, but it is not wicked to give facts.

It is not necessary to charge conspiracy to explain the unpopularity of the present administration of the labor union movement. It is perfectly natural that it should be unpopular.

The World "Shortage" of Steel

Because of the war the normal flow of pig iron and steel from the five largest exporting nations to each other and to other countries suffered severe dislocation. There has been considerable speculation as to what the export movement amounted to in war time and what therefore are the actual or theoretical arrears in consumption. The National Federation of Iron and Steel Manufacturers (British) has published from its office in London an unusual compilation which throws light on this subject. It consists of a table which gives in tons the total pig iron and steel exports of the five chief producing countries in 1913 and 1920, and separately the exports of iron and steel to countries other than the five. The table is as follows:

Pig Iron	1913 Exports Total Exports	1913 Countries to Other Countries	1920 Exports Total Exports	1920 Countries to Other Countries
United States.	287,000	260,300	217,000	171,000
Great Britain.	1,124,200	501,200	579,500	242,000
France	110,900	20,500	301,000	.....
Belgium	16,500	2,000	49,000	11,000
Germany	856,400	322,700	.....	.....
Total	2,395,000	1,106,700	1,372,000*	600,000*
Steel				
United States.	2,601,000	2,328,000	4,486,000	3,950,000*
Great Britain.	3,845,000	3,377,500	2,673,700	2,400,000*
France	467,600	277,300	598,600	.....
Belgium	1,528,800	1,034,400	842,500	466,000
Germany	4,900,000	3,359,200	.....	.....
Total	13,342,400	10,326,400	9,876,000*	7,750,000*

*Figures are estimated or partly estimated.

The Federation's bulletin then says, in commenting on the figures, that "in the three years 1911 to 13 exports to countries outside the five chief producing countries averaged about 1,250,000 tons of pig iron and nearly 9,500,000 tons of steel. During the five years of war exports to these other countries dropped to less than half these figures; even in 1920 the pig iron exports were only slightly over 600,000 tons and the steel exports 7,750,000 tons. If the consumption of these countries had remained at pre-war levels they would have required in the six years 1915-20 a total of 7,500,000 tons of pig iron and 56,500,000 tons of steel, instead of which they received 3,000,000 tons of pig iron and 29,500,000 tons of steel."

In the opinion of the British commentator there still remains a very large potential world demand, about 50 per cent of what would have been consumed, but for the war, and it is observed that this should become effective as soon as prices are brought within the range of the consumer's purchasing power. It may be questioned whether this expectation will be realized. The world apart from the theater of war worried along during four years and the period since the armistice, going without much that it needed, and there is little probability that the so-called void in steel will yet be filled. The individual who has learned by experience to get along without certain things will not now buy in compensation for what he has done without. The same is true of the steel-consuming world. Ultimately its wants will become normal, as expressed in actual purchases, but the millions of tons of steel that were not taken up by peaceful arts in the years of war may well be treated as the traditional water that has passed the mill.

The opening last week at Washington, in the presence of Madame Curie, of the new low temperature laboratory of the Bureau of Mines marks an important advance in the valuable work of this organization. The laboratory has been established primarily to further the experimental work of the Government in recovering helium on a large scale at its extensive operations in the Texas oil fields where low temperature distillation or fractionation is essential. It is a peculiar and as yet unexplained fact, says Prof. R. B. Moore, chief chemist of the Bureau, that in no other natural gas in the world so far discovered is helium found; in the American gas it runs as high as one per cent. This country thus has the lead in a vital material for dirigibles. There are also in prospect some highly important industrial uses for this elusive element or gas. This laboratory may also be the means of studying other low temperature problems affecting steel and metals or alloys, from which interesting results are probable.

Machine Tool Builders Hold Regional Meetings

The National Machine-Tool Builders' Association has held a number of regional meetings under the direction of its general manager, Ernest F. Du Brul. These have been at Indianapolis, Rockford, Ill.; Milwaukee, Grand Rapids, Dayton, Ohio; Cleveland and Cincinnati. Much interesting material has been developed which will be put before the members in the Eastern section at regional meetings to be held as follows: Rochester, May 30; Boston, June 1; Worcester, June 2; Hartford, June 3; New York, June 7.

TO SERVE BUSINESS

Department of Commerce Organizing Committees in Various Industries

The keynote of the various addresses Secretary Hoover has made since he took up the direction of the Department of Commerce has been his desire to know what business and industry would have that department do for the country's good. His declaration of faith as to the proper function of that department of the Government in respect to business is highly encouraging. With his splendid record of successful administration of world affairs, he has accepted the summons to a work which has in it nothing of the spectacular and none of the popular appeal that went with his war-time experience. He comes as a man accustomed to bringing things to pass, to the task of unifying Government activities that bear on commerce and industry and of making all the Government's efforts in those lines count for the utmost in the country's upbuilding.

Readers of THE IRON AGE have been made familiar, through the wide publication of Secretary Hoover's plans, with some of the lines on which he hopes to make early advances. The Secretary has invited the fullest co-operation of men in all industries and departments of trade. He has made it plain that his purpose is to serve every legitimate business interest and in no sense to regulate or restrict or to tell business what to do.

One of the first things in which Mr. Hoover has asked co-operation is the gathering of statistics of production, stocks and market prices in leading industries. The purpose is to obtain an accurate index of business conditions in the country each month and to circulate the information promptly. In connection with his plans Mr. Hoover has called conferences of representatives of leading industries. Three of these were held last week dealing respectively with rubber, chemicals and iron and steel. The plan is to organize service committees in the major industries which will co-operate in the work of the department. Other similar conferences will take place in textile, electrical, construction, mining, leather, fuel and other major industries. So far as agriculture is concerned, statistics are now gathered through the Department of Agriculture.

Last week's conference on iron and steel made a beginning in the organization of the work and there will be further counseling with different departments of the industry. It was recognized by the department officials present that so far as statistics of production are concerned the iron and steel industries are already well supplied with information. It is not expected that the Department of Commerce will undertake a separate monthly collection of pig iron statistics or of statistics of steel ingot production. The former are now promptly published by two iron trade journals and the statistics of ingot production are gathered and published, usually by the tenth of the month, by the American Iron and Steel Institute. The matter of stock statistics will have further consideration, and the department desires to have the sentiment of the trade on this subject. Statistics of pig iron stocks at merchant furnaces are now collected through different associations of producers and it has been suggested that if producers and consumers desire the regular collection and distribution of information concerning such stocks the department might undertake that work.

Secretary Hoover has asked for $600,000 additional appropriations for the work of his department, and the business men of the country can show their interest in the success of his plans by urging upon Congressmen the necessity of favorable action on this request. The deficiency bill as acted upon by the House committee does not carry the entire amount asked for, but Mr. Hoover's request has been met in part by authorization to transfer appropriations from the Census Bureau to the Bureau of Foreign and Domestic Commerce. It is important that this action by the House committee should find an equally favorable response in the Senate.

Bradley Stoughton Resigns as Secretary of Mining Engineers

Bradley Stoughton, who has been secretary of the American Institute of Mining and Metallurgical Engineers for the past eight years, tendered his resignation to the board of directors in a letter written May 17. Mr. Stoughton referred in the letter to his intimation to some members of the board two years ago that incumbency in the office of secretary should not be looked on as permanent, and in February, 1920, he submitted to the directors a written statement to that effect. When Mr. Stoughton was re-elected on Feb. 15, 1921, it was provided that the engagement could be terminated at the pleasure of either party. This action, Mr. Stoughton writes, "was satisfactory to me because it made it possible to tender my resignation when it became convenient for the board to elect my successor. As this time has arrived I tender my resignation herewith."

Mr. Stoughton brought to the secretaryship of the institute talents of a high order, and under his administration there has been a great increase in its membership and influence. The duties of the office make much greater demands than when he entered upon them. The membership eight years ago was 3500 and to-day it is about 9900. In view of the development of local sections and the representation the institute has had through its secretary at meetings of other scientific bodies, the burden of traveling has much increased.

The board of directors, in acting on Mr. Stoughton's resignation, expressed its appreciation of the self-sacrifice with which he has devoted himself to the interests of the organization at the expense of his own professional preferment or financial advantage, and its hope that in the work he will undertake he may have the success his abilities deserve. Mr. Stoughton will continue to perform the duties of secretary until his successor has been elected and has become acquainted with the details of the office.

The Interstate Iron & Steel Co. expects to start its new continuous merchant mill at South Chicago on May 26 or 27.

The Iron Age and Its Readers

In the 76 reading pages of THE IRON AGE of last week there were, besides the iron, steel, metal and machinery markets, over 90 headed articles and some 25 items of information run without heads.

Among articles especially timely was one in relation to the nation-wide efforts to plant the thrift idea in industrial fields. This was a contribution from John F. Tinsley, once a steel-producing company executive and now a steel-consuming company executive, on the operation of a savings plan in Worcester, Mass., over the period of the depression. Another article covered the consolidations which have been going on in Germany among steel makers, showing the realignment of the interests of Stinnes, Thyssen, Krupp, and others.

Considerable attention seems suddenly again to be focused on the production of steel direct from ore. In this issue a method is described, and in the May 12 number were discussed a Pacific Coast development and also the much advertised Basset process of Continental Europe.

Reorganization Plans Received with Favor

(*Continued from page* 1395)

United States and to report on domestic as well as foreign problems relating to the production, distribution and marketing in so far as they relate to the more important industries of the United States. This would be used for the employment of experts, special agents and personal services in Washington.

Making Progress Slowly on Taxation Problems

WASHINGTON, May 24.—Difficulty of the Senate Committee on Finance to draw satisfactory and specific conclusions from testimony it has taken and is taking in connection with revised taxation, has led it to believe that the ambitious program it had outlined to conduct hearings will have to be curtailed and Senator Penrose, chairman of the committee, has determined to bring them to an end this week. While naturally the Senate committee disclaims that it now is inclined to shift the responsibility for fiscal legislation to the House, which under the constitution originates legislation of this kind, that belief has grown. The House denoted its willingness to let the Senate begin tax hearings in order to expedite legislation, the intention being for it, in acting on it first, to base its policy on hearings before the Senate committee.

The Senate committee exhibited lessened interest when business men indicated that only decided changes in internal revenue laws would be acceptable. Comparatively few have expressed their views and they have not offered plans which appealed to the Senate committee as being of a sufficiently specific or broad enough basis for devising a program. Nevertheless, complaint is made that the Senate committee should not summarily draw the hearings to a close, but should give an opportunity for others to be heard. As yet no iron and steel men have appeared. Shortening of the hearings also is due to the desire of leaders of Congress to enact important legislation at this session as quickly as is expedient to be followed by adjournment. Serious doubt is entertained, however, that Senator Penrose is safe in his prediction that important legislative measures will be enacted before Aug. 1. It is a fact, though, that Congress can proceed at a quick rate when it is in the mood, but the slow pace at which it has been going assuredly does not denote that it will have passed upon the major measures before the date named by Senator Penrose.

The effect of excess profits taxes on prices of commodities has shared prominently in the tax hearings. It is especially desired by senators to know whether the repeal of these taxes would tend to lower the costs to the consumers. It is a question that has found a wide divergence of opinion among witnesses. Tax authorities representing large business and industrial organizations have told the Finance Committee that this form of taxation adds at least 20 per cent to the costs. It is the opinion of many senators that the excess profits tax is paid by the ultimate consumer and while they realize that it must be repealed, they are perplexed as to providing a substitute.

Sales Tax Agitated

Much argument has been made regarding the adequacy of a general sales tax to make up the deficit caused by repeal of excess profits taxes. Retailers have been particularly strong supporters of the former plan and practically all business interests have agreed that a reduction of the surtax is essential to readjustment. Sentiment is opposed to continuation of this tax and is shared by President Harding, Secretary of the Treasury Mellon and other Administration representatives. It does not appear that there is much chance for the passage of a sales tax, unless a soldier bonus bill is passed.

The House Committee on Ways and Means soon will begin tax hearings and it is expected will face difficulties that now are being contended with by the Senate Finance Committee.

Differences of Opinion as to Tariff Legislation

WASHINGTON, May 24.—With full realization that it faces vigorous opposition, members of the House Committee on Ways and Means have prepared themselves for a hard fight in the effort to have Congress enact ad interim tariff legislation. Ever since it became known that the committee, which itself had a difference of opinion, was contemplating such legislation, it has been the target of considerable opposition which had grown to such proportions that it apparently was a serious question as to whether the Ways and Means Committee would proceed with it. The answer, however, was given last week when Representative Longworth, a member of the committee, introduced a joint resolution which would make rates in the forthcoming permanent tariff bill effective on and after the date the latter is reported to the House. The Committee last Saturday ordered a favorable report on the resolution.

The measure carries decidedly broad powers and is of an elastic character. This is shown by Section 2, which provides that the Committee on Ways and Means may, in its discretion, incorporate in the permanent tariff bill an emergency clause, "declaring that the safeguarding of the public revenue requires the immediate taking effect of any or all such new customs duties or increased amounts of customs duties; and such emergency clause may also declare that the safeguarding of the public revenue requires the immediate taking effect of any other provision or provisions of such bill."

Gives House Committee Power

In other words, the resolution gives the House committee the power to apply any or all of the rates. Criticism has been made that this feature of the measure leaves itself open for discrimination. Inasmuch as one industry might be favored by application of the permanent rates from the date the permanent bill is reported, while another might be denied similar action. The phrasing of the section is well executed, because by the elasticity of the provisions they could be used to meet the objection of some who supported the emergency tariff bill. The latter have protested against ad interim legislation on the ground that by making the permanent tariff rates applicable on the day of the reporting of the bill, it would invalidate those carried on agricultural products in the emergency measure. Under the joint resolution, as drawn, the higher rates in the emergency bill could be continued in operation pending passage of the permanent act by the simple process of not applying the ad interim legislation to agricultural products. The joint resolution would require bonds by importers upon the withdrawal of merchandise, subject to a new duty in order to guarantee the payment of the difference in customs that may prevail between the old and the new rates.

Opposition to the Plan

Opponents to the legislation, including not only Democrats but some permanent Republican Senators, maintain that it virtually constitutes an embargo in the nature of what they pretend to anticipate as excessively high rates that will be carried in the new permanent tariff act. This position, however, is said by supporters of the legislation to be far fetched and without justification. This legislation has been pointed out previously as supported by the United States Tariff Commission and by individual members of the Cabinet, though the attitude of the President regarding it has

not been announced. In effect the policy is the same as that practiced by other leading nations, and it is asserted that it has worked well for them. There is a distinct variance of opinion as to whether the legislation will ever be made a law.

Permanent Tariff Bill

It probably will be June 1, before the House Committee on Ways and Means reports the permanent tariff bill, several delays having been encountered. All of the schedules have been printed and are being considered one at a time. They are being taken up in the order in which they appear and the metal schedule coming under "C," probably will be reached the latter part of the current week.

The fact that the Senate and House reached an agreement on the anti-dumping and exchange features of the emergency tariff without protracted conference came as a surprise. Belief prevailed that these features would be the object of rather extended discussion; instead the conference report was adopted by the Senate last Friday and by the House yesterday. The provision relating to dyestuffs was changed so that the licensing is restricted to three instead of six months. The anti-dumping and exchange provisions are largely those that were framed by the Senate.

The House imposed a dumping duty on all imported merchandise sold at a price less than the foreign home value, or in the absence of such value, at less than the value to countries other than the United States, or in the absence of both such values, at less than the cost of production.

The Senate adopted the basis of the House bill in determining the dumping duty, but provided that the anti-dumping title shall apply after an investigation by the Secretary of the Treasury and he has made public his finding that an industry in the United States is being or is likely to be injured, or is prevented from being established by reason of the importations of merchandise into the United States at less than its fair value.

The House receded from its disagreement to this part of the amendment with some amendments.

Will Urge Early Action on Longworth Resolution

WASHINGTON, May 24.—Regardless of the strong opposition which they are aware will develop against it in both the House and the Senate, especially among Democratic members, but also from some prominent Republican Senators, it is stated, the House Committee on Ways and Means intended to call up this week the Longworth joint resolution making any or all rates in the permanent tariff bill effective from the date it is introduced in the House at the discretion of the Committee on Ways and Means. Some of the opposition is due to the power it would vest in the one committee and because of this, if the measure does succeed in passing, it may be broadened in this respect. Representative Young of North Dakota was the only Republican member of the Ways and Means Committee who voted against a favorable report on the resolution, lining up with the Democratic members of the committee, who voted solidly against it. Mr. Young claims "it is an attempt to delegate legislative authority which is prohibited under the constitution. Its enactment would give the Ways and Means Committee power to fix duties 1000 per cent high, to be put into operation for at least five months and possibly longer."

Reply has been made by a supporter of the resolution that it does not give the Ways and Means Committee power to fix rates, but only to put into operation those that are finally decided upon by Congress, though, of course, the committee is the original body which frames the tariff bill and recommends duties. It also is stated by these supporters of the resolution that Mr. Young is drawing unjustified conclusions in suggesting that the rates will be unduly high and that his position is inconsistent inasmuch as he was in charge of the emergency bill in the House which fixes extremely high duties on agricultural products.

The report on the resolution points out that the plan has been recommended by the Tariff Commission and Secretary of Commerce Hoover.

"The effect of this resolution will be to empower the Ways and Means Committee in its discretion to incorporate in the tariff bill, now under preparation, a clause giving immediate effect to the rates of duty and other provisions contained therein," the report states.

"No doubt the coming tariff bill will contain many rates of duty substantially higher than those in the existing law, and obviously if no such precaution as this be taken so soon as the increases are made public upon the report of the bill to the House, a great flood of importations will come in during the period of discussion of the measure, thereby causing large revenue losses to the Government and serious damage to American industry. This has been the invariable rule during the period that former tariff bills have been under discussion in the House and Senate.

"Even assuming that this interim period in the case of the coming tariff bill will not exceed the average, that is to say, five months—between the dates of its reporting to the House and of its final enactment into law, the loss of revenue resulting from the artificially stimulated imports under the rates of existing law will inevitably run up into the hundreds of millions of dollars at the time when the Government is in need of revenue as never before, and the resulting damage to American industries will be incalculable. Similar legislation is in force in many countries and has been for many years, notably in France, Italy, Great Britain, Canada and Australia."

Increased Cost of Cars

WASHINGTON, May 24.—Increases in the cost of construction of steam and electric railroad cars in 1919 as compared with 1914 are sharply reflected in a preliminary statement of the 1919 census issued yesterday by the Bureau of Census. Returns, which are subject to correction, were received in 1919 from 121 establishments which manufactured 162,511 steam and electric railroad cars valued at $403,517,000, or an average of $2,483 per car, as compared with 137,823 cars in 1914, valued at $164,960,000, or an average of $1,199 per car. The figures include such cars as were built in railroad repair shops, and as subsidiary products by establishments primarily engaged in other lines of manufacture.

Reducing Motor Car Prices

DETROIT, May 24.—The Hupp Motor Car Corporation, Detroit, is the latest automotive company to enter the lists of price reducers. This concern announced May 15 a reduction of $200 on its open models, and of $315 and $325 on its two closed models. These reductions were made effective immediately.

The Dort Motor Car Co., of Flint, has made a reduction of from $100 to $180 on each model.

Other Detroit motor car manufacturers are either guaranteeing their prices at least until August 1, as the Columbia Motors is doing, or are resting on the statement that past reductions were made in anticipation of present labor and material cost declines, and so prices will not be changed at present.

Illustrative of the sharp drop in fuel oil is a June and July contract for 24 to 26 deg. gravity oil which was offered to the purchasing agent of a large Chicago steel plant at 45c. per barrel, f.o.b. shipping point, Oklahoma. The high peak last year was about $3.75 a bbl., Oklahoma.

Iron and Steel Markets

AWAIT RAIL WAGE CUTS

Industry Relying on Lower Freights to Start Business

Recessions in Plates, Bars and Pig Iron—Lower Ore Vessel Rates

The further slowing down of operations at iron and steel plants, as well as of new buying, has dispelled any hope recently entertained of a turn for the better. In the industry attention is centering upon the reduction in railroad wages, ranging from 10 to 15 per cent, effective July 1, as making possible the lower freights which are now expected to bring such further readjustment in iron and steel prices as will start business.

Opinion is uniform that freight rates are coming down, but the belief that they may be some months hence points to light buying of steel products meanwhile, as no stock will be accumulated on to-day's prices. Meanwhile, the railroad wage reductions are regarded as a favorable factor, in view of the easier financial condition of the railroads in the second half of the year. The failure of many railroads to pay their steel bills has tightened the finances of not a few mills.

The steel price schedule as revised in early May is being generally maintained, because with operations averaging about one-third of capacity scarcely a rolled product on the list is selling at a profit.

One interesting development in the East was the breaking away of several plate mills from the 2.20c. basis generally adopted a few weeks ago. One mill has gone to 2c. and in another case 2.10c. is reported. The 1000-ton purchase of the American Locomotive Co. for its Chinese locomotive order brought out the low price of the week, reported at somewhat under 1.90c.

From Chicago come reports of some irregularity in steel bar prices, 1.90c. Pittsburgh having been done in a number of cases where Chicago district mills have practically made their own basing price. At Cleveland 1.90c. is the common price on hard reinforcing bars, with hard angles at 2c. Eastern bar iron makers are now selling their product at 1.90c., a reduction from 2c.

The week has been one of extreme quiet in pig iron and further price recessions have been recorded. The decline on foundry grades in eastern Pennsylvania was 50c. to $1, while a sale of 1000 tons of basic iron made at Chicago for delivery at an Eastern plant was at $21.50, Valley furnace, or 50c. below the recent prevailing quotation, and one of 2000 tons to a Sharon, Pa., company was closed at $21.75, Valley. In some centers a decreased demand for automobile castings is noted.

The fixing of vessel rates on Lake Superior iron ore at 80 cents from the head of the Lakes to Lake Erie is one step toward the making of new ore prices. This rate is 30 cents below last year's and the same as that ruling in 1919. The new Escanaba or Lake Michigan rate is 60 cents to Lake Erie ports and 48 cents to South Chicago.

Less than 5000 tons of fabricated steel work represents the week's total of business in sizable projects. Postponement of awards has been rather marked. Notable structures continue, however, to come before fabricators, among the latest being a 4000-ton bridge at Detroit and 3000 tons for a stadium for Ohio University.

The new French tariff on imports from the United States, which became effective May 1, represents an average increase of 67.5 per cent over the tariff prevailing on April 1 of this year and from 67.5 to 82.5 per cent increase over the 1914 tariff. Duties exacted on importations from Germany are about 50 per cent higher. There is a free list on importations from Italy and Spain, which have free lists on French importations and a lower tariff prevails with Great Britain.

Pittsburgh

PITTSBURGH, May 24.

Although the recent announcement by the Railroad Labor Board that it would recommend a reduction in railroad labor scales, effective July 1, is looked upon as a constructive step in the general readjustment process, the immediate effect has been to still further restrict the demand for iron and steel on the ground that lower wages presage lower freight rates and that the latter development will permit still further reductions in commodity prices. The week under review easily has been the quietest the trade here has experienced this year. Buyers are ordering entirely in small lots and seeking immediate delivery. The desire is to avoid, as far as possible, the accumulation of stocks carrying to-day's prices. Opinion is uniform that freight rates are coming down, but is sharply divided as to the time of this change. It is argued that because of the straitened financial condition of the railroads they must be allowed a period of a few months of the present rates and the lower wage scales in order to build up their treasuries. Those who figure an early revision downward of rates support their position by the claim that the present rates are prohibitive and one of the big obstacles in the path of an industrial recovery. It is further pointed out that since the railroads already have effected economies through the liquidation of excessive labor, put on during the period of Government control, and soon will be able to materially cut their pay rolls, a reduction in rates would be no more of a hardship on them than their present experience of having high rates and doing little business. Those arguing in favor of the early reduction in freight rates assert that with the price reductions that might result from lower transportation charges, buyers would not have much of an argument to present in support of additional price cuts. In other words, the end of the buyers' strike would be hastened by an early lowering of freight rates.

There have been no important changes in prices, but it would be gross exaggeration to describe the market as strong, or even firm. Prices are holding because of the unattractive size of the orders coming out and a pretty general realization that until there

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	May 24, 1921	May 17, 1921	Apr. 26, 1921	May 25, 1920
No. 2X, Philadelphia‡	*$25.50*	$25.84	$26.26	$47.15
No. 2, Valley furnace†	*23.00*	23.50	24.50	45.00
No. 2 Southern, Cin'ti†	26.50	26.50	27.50	45.60
No. 2, Birmingham, Ala.†	22.00	22.00	23.00	42.00
No. 2, foundry, Chicago*†	23.00	23.00	24.00	43.00
Basic, del'd, eastern Pa	25.00	25.00	25.00	44.80
Basic, Valley furnace	*21.75*	22.00	22.50	43.50
Bessemer, Pittsburgh	25.96	25.96	26.96	44.40
Malleable, Chicago*	23.00	23.00	24.00	43.50
Malleable, Valley	24.00	24.00	25.00	44.00
Gray forge, Pittsburgh	*22.96*	23.46	25.46	43.40
L. S. charcoal, Chicago	37.50	37.50	38.50	57.50
Ferromanganese, del'v'd	*80.00*	85.00	90.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	37.00	37.00	37.00	60.00
O.-h. billets, Pittsburgh	37.00	37.00	37.00	60.00
O.-h. sheet bars, P'gh.	39.00	39.00	39.00	80.00
Forging billets, base, P'gh.	42.00	42.00	42.00	80.00
O.-h. billets, Phila.	42.74	42.74	42.74	64.10
Wire rods, Pittsburgh	48.00	48.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	2.20	2.20	2.20	2.75
Skelp, sh. steel, P'gh, lb.	2.20	2.20	2.20	3.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.25*	2.35	2.35	4.25
Iron bars, Chicago	2.38	2.38	2.38	3.75
Steel bars, Pittsburgh	2.10	2.10	2.10	3.50
Steel bars, New York	2.48	2.48	2.48	4.02
Tank plates, Pittsburgh	2.20	2.20	2.20	3.75
Tank plates, New York	2.58	2.58	2.58	4.02
Beams, etc., Pittsburgh	2.20	2.20	2.20	3.10
Beams, etc., New York	2.58	2.58	2.58	3.27
Steel hoops, Pittsburgh	2.75	2.75	2.75	5.00

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	May 24, 1921	May 17, 1921	Apr. 26, 1921	May 25, 1920
	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	4.00	4.00	4.00	5.50
Sheets, galv., No. 28, P'gh.	5.00	5.00	5.00	7.00
Sheets, blue an'l'd, 9 & 10.	3.10	3.10	3.10	4.50
Wire nails, Pittsburgh	3.00	3.00	3.25	4.00
Plain wire, P'gh	3.00	3.00	3.00	3.50
Barbed wire, galv., P'gh.	4.10	4.10	4.10	4.45
Tin plate, 100-lb. box, P'gh.	$6.25	$6.25	$6.25	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$15.00	$15.00	$14.25	$37.00
Carwheels, Philadelphia	**18.00**	16.00	18.00	40.00
Heavy steel scrap, P'gh	13.50	13.50	13.00	25.00
Heavy steel scrap, Phila.	12.00	12.00	11.00	23.00
Heavy steel scrap, Ch'go.	11.50	11.50	11.00	22.50
No. 1 cast, Pittsburgh	18.00	18.00	18.00	32.00
No. 1 cast, Philadelphia	18.00	18.00	18.00	37.00
No. 1 cast, Ch'go (net ton)	*13.50*	14.00	13.50	36.50
No. 1 RR. wrot, Phila.	15.00	15.00	17.00	33.00
No. 1 RR. wrot, Ch'go (net)	10.50	10.50	10.00	25.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$3.25	$14.00
Furnace coke, future	3.40	3.40	3.75	14.00
Foundry coke, prompt	4.50	4.50	4.50	15.00
Foundry coke, future	5.00	5.00	5.00	15.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**13.25**	13.00	12.75	19.00
Electrolytic copper, N. Y.	**13.25**	12.75	12.37½	19.00
Zinc, St. Louis	*4.75*	4.85	4.95	7.60
Zinc, New York	*5.25*	5.35	5.45	7.95
Lead, St. Louis	*4.80*	4.95	4.35	8.15
Lead, New York	*5.10*	5.12½	4.35	8.50
Tin, New York	*32.25*	33.25	32.00	51.00
Antimony (Asiatic), N. Y.	5.25	5.25	5.25	9.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

is some definite sign of interest in supplies on the part of buyers, it is futile to attempt to stimulate business by price concessions. There is not an article in iron and steel, finished or unfinished, that is selling at a profit to-day, and in practically all cases selling prices represent material losses on to-day's operations. Such wage reductions as have taken place do not mean much of a saving with so few blast furnaces in production and steel plant operations at one-third or less of capacity. Production is way down, but there still are substantial stocks to be worked into consumption and few are hopeful that there will be much improvement before Sept. 1.

Pig iron production for this month will be much less even than it was last month because there has been a further loss in the active list this month. The Brier Hill Steel Co. shut off the blast a couple of weeks ago at the one furnace it had on last month, while the Carnegie Steel Co. is reported to have only 16 of its 59 furnaces making iron, the smallest number in blast in the history of the company.

Structural steel business, which a good many are watching with an idea of catching the pulse of trade, still is of moderate proportions. Awards are fairly numerous but rarely exceed 100 tons. Railroad business, for obvious reasons, is lacking and the automobile industry is not counted upon to be much of an outlet for steel during the period of price reductions which recently started.

The pig iron market still is weak and there are intimations that quotations of less than $3.25 have been made against a couple of inquiries for furnace coke.

Pig Iron.—We note two 1000-ton sales of standard basic for prompt shipment at $21.75, Valley furnace, and this may be regarded as the present market price in the lack of sales by those still asking $22. There are reports that sales have been done at $21.50, Valley furnace, but they cannot be verified, although some melters have been asked to make a bid of this price and have been given assurance that the iron would be secured. Outside of the business in basic iron, trading has been slow and sales have been entirely in carload lots. These sales have been at $23 to $23.50 for No. 2 foundry, and $24 for Bessemer and malleable grades. It is stated that an order of sufficiently attractive size readily could be placed at $23 for No. 2 and possibly at even less.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$21.75
Bessemer	24.00
Gray forge	$22.00 to 22.50
No. 2 foundry	23.00 to 23.50
No. 3 foundry	22.50 to 23.00
Malleable	24.00

Ferroalloys.—Prices still tend downward because so few inquiries are coming out that competition for business is growing sharper. A West Virginia steel manufacturer who recently inquired for 250 tons of ferromanganese is reported to have bought 150 tons of English resale material, at $80 delivered for 76 to 80 per cent. Domestic material of the same grade is quoted from $80 to $82.50, while some makers now are quoting 78 to 82 per cent at $85 delivered. English producers have cut their price to $75, c.i.f. Atlantic Seaboard for 76 to 80 per cent alloy. No business is being done in spiegeleisen in this district, but it is reported that business has been done in the east at $32.50 for 20 per cent alloy and this probably is as high as could be done here. The highest price reported on sales of 50 per cent ferrosilicon in the past week was $72, furnace, freight allowed for a single carload. It is said that this was resale material, but there is also a seemingly au-

thentic report that it was shipped direct from the furnace. Although there has been no official announcement by Jackson, Ohio, producers, there is no question that both Bessemer ferrosilicon and silveries can be bought well under the last official quotations. Ten per cent Bessemer ferrosilicon is available at $38 furnace, or $10 a ton under the public quotation. Concessions from $1.50 to $2 per ton are being offered on silveries.

We quote 76 to 80 per cent ferromanganese at $80 to $82.50 delivered on domestic; 78 to 82 per cent, $85; English, 76 to 80 per cent, $75, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $32.50 furnace quoted by makers on direct business and $28 to $30 furnace on resale tonnages; 50 per cent ferrosilicon, $72 to $80 furnace, freight allowed, for domestic and $85 to $90 delivered for foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $44.50; 10 per cent, $48; 11 per cent, $51.30; 12 per cent, $54.60. Silvery iron, 6 per cent, $35; 7 per cent, $36.50; 8 per cent, $38.50; 9 per cent, $40.50; 10 per cent, $43; 11 per cent, $46.30; 12 per cent, $49.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Prices are entirely nominal and very largely untested because of a dearth of inquiries in this district. All makers here are quoting stabilized prices of April 13, but there is an impression that concessions would be made against attractive inquiries. The Falcon Steel Co. is reported to be in the market for a tonnage of sheet bars.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $37; 2 x 2-in. billets, $39; Bessemer and open-hearth sheet bars, $39; slabs, $38; forging billets, ordinary carbons, $42, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—There is practically no demand and prices are nominal and untested. There is such a limited demand for the products of rods that consumption necessarily is small and consumers are disinclined to load up because they do not believe that prices have yet struck bottom. Prices are given on page 1423.

Wire Products.—There is no special change in the general situation with the leading manufacturers quoting the April 13 schedules but finding business extremely light. Buyers still seem to lack confidence in these prices and accordingly are taking hold very cautiously. Against the small lots of bright nails that are being ordered, the quotation quite uniformly is $3.25 base per keg Pittsburgh, but business has been lost at this figure, giving ground for a belief that all are not holding when chances for business present.

We quote wire nails at $3 to $3.25 base per keg, Pittsburgh, and bright basic and Bessemer wire at $3 base per 100 lb. Pittsburgh.

Iron and Steel Bars.—Buyers still are pursuing a policy of frequent small purchases and asking immediate delivery. Intimations are heard that some makers have quoted 1.90c. base, but there is no evidence that any business has been taken that low, although it is admitted that an order of sufficient size might bring concessions from the stabilized quotation of 2.10c. Very little demand is coming out for reinforcing bars and the market is easy on those rolled from old rails or discard steel. Iron bars still are extremely dull.

We quote steel bars rolled from billets at 2.10c.; reinforcing bars, rolled from billets, 2.10c. base; reinforcing bars rolled from old rails, 1.90c. to 2c.; refined iron bars, 2.75c.; in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—All of the fabricating companies in this district are getting a fair number of small orders, but there are only a few awards for more than 100 tons involved. The Jones & Laughlin Steel Co. has taken 300 tons for a boiler and tank shop for the Boviard & Seyfang Mfg. Co., Bradford, Pa., and a like tonnage for a building to house the automatic exchange of the Bell Telephone Co. of Pennsylvania, Highland Avenue, Pittsburgh. The Pittsburgh-Des Moines Steel Co. will furnish 125 tons for a boiler house at plant No. 3 of the Oliver & Snyder Steel Co., Oliver, Pa. The McClintic-Marshall Co. reports taking 200 tons for an ash pocket at the Sixty-sixth Street Station of the Brooklyn Edison Co., Brooklyn, and several small jobs, aggregating about 250 tons. It is reported here that bids soon will be asked against the Federal Reserve Bank Building to be erected in Maiden lane, New York, and for which between 12,000 and 15,000 tons of steel will be required. It also is reported that there has been some revision in the Statler Hotel of Buffalo plans, and instead of taking 8415 tons, as first reported, this project will not go over 8000 tons, and may take only 7500 tons. Not much is going on in plain material, as current business is being covered largely from fabricators' stocks. Prices are given on page 1423.

Plates.—Demand is entirely for small lots for immediate shipment and while the stabilized base of 2.20c. Pittsburgh, rules in such transactions, it is an open question whether this price could be obtained on large tonnages.

Cold-Finished Steel Bars.—Business still is extremely limited both in the shafting sizes and the smaller lines. The past week has seen a further tapering off in the demand for screw stock from the automotive industry and other users are taking hold only as supplies are required. All makers are holding to a base of 3.10c., but it is believed that a sizable order would cause some sharpening of pencils.

Hot-rolled and Cold-rolled Strips.—Demand is very irregular, running fairly well one day only to drop off the next. An Ohio producer who received the bulk of the Ford Motor Co. business, amounting to about 9000 tons of hot and cold-rolled strips, is reported to be operating full, but the general average of strip mill operations is not above 30 per cent of capacity. Most makers have refused to adopt the prices made on the Ford business and are holding to 2.75c. base for hot-rolled and 5.50c. base for cold-rolled. The low prices named against the Ford order, however, are a factor in keeping down demands to actual needs.

Hoops and Bands.—Demand is extremely slow with sales merely of the small tonnages which buyers must have. A quotation of 2.75c. base Pittsburgh is uniform, but what might be named against a real order is another matter.

Nuts, Bolts and Rivets.—Makers in this district detect no appreciable increase in the demand. On the contrary, buyers are more closely confining purchases to actual needs than at any other time since the dullness set in. Prices and discounts are at the April 14 list, chiefly because makers do not believe concessions at this time would stimulate buying and also because they figure current prices to be pretty low against orders of the size that are coming out. Prices and discounts are given on page 1423.

Spikes.—Recent inquiry of the Southern Pacific Railway for 13,000 kegs of standard spikes is understood to have developed considerable price cutting. All Pittsburgh district makers named a price of 3.40c. base on this business, but it is reported that the equivalent of 3.10c. Pittsburgh was named by some makers outside this district. It is probable that this order will go to a Western mill and also the 800 kegs which recently were inquired for by the Alaskan Commission. The Pittsburgh & Lake Erie Railroad is planning on tracking its main line with 115-lb. sections this summer, the rails already being in place along its lines. Apparently this work is waiting on the wage announcement of the Railroad Labor Board, on June 1, which will become effective July 1. This road has not yet closed on the 2000 kegs of standard spikes for which it put out an inquiry several weeks ago. Only a fair demand is noted for small spikes. Prices are given on page 1423.

Cut Nails.—Leading manufacturers have made a cut of $5 per ton from the recent quotations and also have reduced the differential for less than carload lots from 25c. to 10c. per 100-lb. This change makes the present price 3.50c. base for carload lots and 3.60c. for less carloads, f.o.b. Wheeling, by LaBelle Iron Works and f.o.b. Birdsboro or Pottstown by the Reading Iron Co.

Chain.—All makers are observing the base of 6.25c. for 1-in. proof coil steel chain established April 23. Business is extremely moderate.

Coke and Coal.—The spot market in furnace coke still is quotable from $3.25 to $3.50 per net ton oven, but the latter price does not find much basis in sales. In general, $3.40 is the maximum and the more common price is $3.25, this price having been done on coke having a high reputation for quality. Inquiries are noted from the East, one for seven to eight cars a day and the other for four to five cars a day, to run for 30 or 60 days. It is reported that some producers have quoted less than $3.25 against this business, but there seems to be some hitch in the negotiations and

since a sale has not yet been effected, we continue to hold to $3.25 as a minimum. Spot foundry coke is quotable from $4.50 to $5.50, but with really choice brands available at $5.25 and possibly at $5, there is not much basis for the top quotation. The Robesonia Iron Co., which is planning to resume next month, is in the market for 8000 tons of coke a month for from two to six months. The coke wanted by this company would have to be low in phosphorus and probably would command a fair-sized premium over standard grade. The coal market shows no increase in strength despite an increased demand in the shape of larger shipments to the lakes. It is reported that one large operator temporarily is short of tonnage to meet his obligations and is buying to cover them. This interest is paying $2 for mine run by-product coal, but this is the maximum price on this grade, as others are reported to be taking business at as low as $1.80. Gas coal is quotable from $2.15 to $2.50 for mine run grade while spot tonnages of steam coal range from $1.75 to $2.25 for run of mine.

Iron and Steel Pipe.—Buyers still are covering only their most pressing requirements and since shipping instructions accompany all orders, the business is going to the makers who have stocks. A great deal of the current production is going into stock, as demands alone are insufficient to absorb the present output. There are suggestions, as there usually are in such dull periods as the present one, of price concessions, but they cannot be verified. It is reported that some of the Southern jobbers are trying to turn back some of their purchases on the ground they are unable to pay for them. Discounts are given on page 1423.

Boiler Tubes.—Present prices, although sharply lower than those which prevailed earlier in the year, have been without beneficial effect upon the demand, which still is extremely limited. Discounts are given on page 1423.

Sheets.—Mill operations do not average much above 30 per cent of capacity, taking the industry as a whole. This very clearly tells the story of the present demand. Some automobile business still is coming out in the shape of specifications against old contracts and releases against suspended shipments. In the common finishes, however, buyers merely are taking hold in keeping with their actual requirements. Prices are unchanged, but the test of sizable inquiries is lacking. Prices are given on page 1423.

Old Material.—Withdrawal from the market by an independent steel interest which recently made a number of purchases has tended to check the upward tendency of prices due to the fact that dealers who thought they saw a chance for small profits on a quick turnover now are less anxious to secure tonnages. Material can not be bought any more cheaply now than a week ago, but the market plainly is quieter than it has been. The Baltimore & Ohio Railroad is asking bids on 22 carloads and 11,755 gross tons of old material, which must be in by noon, May 31. The list also includes 3000-lb. high-speed steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13.50 to $14.00
No. 1 cast cupola sizes	18.00 to 19.00
Rerolling rails, Newark and Cambridge, O.; Cumberland, Md.; Huntington, W. Va.; Franklin, Pa., and Pittsburgh	14.00 to 14.50
Compressed sheet steel	11.00 to 11.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	14.50 to 15.00
Railroad coil and leaf springs	14.50 to 15.00
Railroad grate bars	13.00 to 13.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and heavier	18.00 to 19.00
Railroad malleable	13.00 to 14.00
Iron car axles	22.00 to 23.00
Locomotive axles, steel	20.00 to 21.00
Steel car axles	15.50 to 16.00
Cast iron car wheels	15.00 to 15.50
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	9.00 to 9.50
Sheet bar crop ends at origin	13.50 to 14.00
Heavy steel axle turnings	11.00 to 11.50
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Cast iron borings	10.00 to 10.50
No. 1 railroad wrought	13.00 to 13.50

Tin Plate.—Consumers are ordering supplies as they are needed. About the only encouraging feature of the business is that some makers, unable to comply with delivery terms, have lost orders. Apparently the can makers are sailing close to the wind with regard to their tin plate stocks, and what they want they must have in a hurry. There is no shading of the stabilized price of $6.25 per base box, Pittsburgh, on production plate, but stock items readily are available at $5.50, and it is reported that some business has been done in this kind of material as low as $5 per base box.

Steel Rails.—Fair demand for light rails is coming from the coal companies, but other buyers are pursuing a conservative course in the matter of purchases. There has been no change in quotations, but if there is a definite tendency, it is in favor of buyers.

We quote 25 to 45-lb. sections, rolled from new steel, 2.20c.; rolled from old rails, 1.90c. to 2c.; standard rails, $45 mill for Bessemer, and $47 for open-hearth sections.

British Iron and Steel Market

Market Stagnant—Export Inquiry Fairly Active —Prices Still Sagging

(By Cable)

LONDON, ENGLAND, May 23.

Settlement of the coal strike this week is anticipated. Cleveland foundry pig iron is scarce and there is little hope of a general resumption of production until fuel is cheaper. Official quotations are unchanged, but sellers of No. 3 foundry iron are asking a premium of 10s. ($1.98). The hematite market is idle. East Coast mixed numbers are officially unaltered, but export sellers are obtaining £7 10s. ($29.63) f.o.b.

Steel is quiet, but there are indications of a revival of exports, especially to the Far East. Continental competition continues keen. Good sales have been made to Wales of Belgian semi-finished steel at £7 ($27.65) c.i.f. United Kingdom, but quotations are now harder. Belgian steel merchant bars are quoted up to £9 10s. ($37.53) f.o.b.

In tin plate there is a fair demand for oil sizes. Sellers of 20 x 10 in. ask £2 2s. to £2 3s. ($8.30 to $8.50) f.o.b. Galvanized sheets are the subject of some inquiry, both from India and from South America.

We quote per gross ton except where otherwise stated f.o.b. maker's works, with American equivalent figured at $3.95 per £1 as follows:

Durham coke	£2	2				$8.30		
Cleveland basic	6	0				23.70		
Cleveland No. 1 foundry	6	5				24.69		
Cleveland No. 3 foundry	6	0				23.70		
Cleveland No. 4 foundry	5	19				23.51		
Cleveland No. 4 forge	5	17½				23.21		
East Coast mixed	8	0	& £8	5*		31.60	& $32.59	
Ferromanganese†	18	0				71.10		
Ship plates	17	0	to 19	0		67.15	to 75.05	
Boiler plates	24	0	to 25	0		94.80	to 98.75	
Tees	16	0	to 18	10		63.20	to 73.08	
Channels	15	5	to 17	5		60.24	to 68.14	
Beams	15	0	to 17	10		59.25	to 69.13	
Round bars, ¾ to 3 in.	15	10	to 16	10		61.23	to 65.18	
Rails, 60 lb. and up	13	0	to 15	0		51.35	to 59.25	
Billets	11	10	to 12	10		45.43	to 49.38	
Sheet and tin plate bars, Welsh	11	0	to 11	10		43.45	to 45.43	
Galvanized sheets, 24 g.	22	0	to 22	10		86.90	to 88.88	
Black sheets	19	0	to 20	0		75.05	to 79.00	
Tin plate base box	1	6	to 1	9		5.14	to 5.73	
Steel hoops	17	10	to 20	0		69.13	to 79.00	

*Export price. †Nominal.

The American Ore Reclamation Co. has issued a license to the McKinney Steel Co. for the use of the Dwight and Lloyd sintering process. The first installation will be at the River furnaces, Cleveland, and will consist of one large size Dwight and Lloyd sintering machine having a capacity of 400 tons of sinter per day from blast furnace flue dust. The plant is being designed and construction will begin at an early date.

The next meeting of the National Association of Brass Manufacturers will be held at the Iroquois Hotel, Buffalo, on June 2 and 3.

Chicago

CHICAGO, May 24.

The market remains inactive and while most prices are rather firmly held, shading on some products is occurring more frequently. On soft steel bars, 1.90c., Pittsburgh, has been quoted in a number of transactions, and business has been taken at as low as 1.87½c., Pittsburgh. Cast iron pipe is weak and has apparently receded definitely from a $55 Birmingham base to from $5 to $10 under that price. There is little business of size in the market, the largest being a total of 7000 tons of hot-rolled strip wanted by automobile interests. Pig iron is not altogether steady, but owing to paucity of orders, prices remain untested. On 1000 tons of basic bought for Eastern delivery $21.50, Valley furnace, was done.

The falling off in steel orders is reflected in a decline in mill operations. The Inland Steel Co. has curtailed its steel output to 30 per cent of capacity. The Illinois Steel Co. continues to operate at about 32 per cent of normal while its pig iron output also remains unchanged, 10 out of 29 furnaces being in blast. Other producers are operating at the same rate as last week or on a somewhat reduced basis.

The announcement that the wages of common railroad labor will be reduced July 1 made a favorable impression in the steel trade. While it is not felt that the carriers can be counted on for much buying in the immediate future, the reduction in common labor wage rates is one of the steps which must be taken before the recovery of the railroads can be consummated.

It is reported that the Great Northern has awarded 500 refrigerator cars to the General American Car Co.

Pig Iron.—A local purchasing office has bought 1000 tons of basic for delivery at an Eastern plant at $21.50, Valley furnace. Aside from this purchase, buying has been light and largely confined to carload lots. In small quantities No. 2 foundry is available at $23, local furnace, but it is believed that this figure would be shaded on an attractive tonnage. A Milwaukee melter has bought four carloads of resale foundry, 2.75 to 3.25 per cent silicon, at a flat price of $24 delivered. Deducting $1 for silicon and 80c. for freight, this price is equivalent to $22.20, Chicago, for No. 2 material. At least one Southern producer is offering foundry at $22 base, Birmingham, but even this price is unattractive from a local standpoint because of the heavy freight charges. Among the few sizable inquiries in the market is one for 500 tons of malleable from the Chicago, Milwaukee & St. Paul and one for 100 tons of 7 per cent silvery and 100 tons of higher silicon foundry from a Wisconsin user.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 70c. per ton:

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$37.50
Northern coke, No. 1, sil. 2.25 to 2.75	23.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	23.00
Northern high phos	23.00
Southern foundry, sil. 1.75 to 2.25	28.67
Malleable, not over 2.25 sil	23.00
Basic	23.00
Low phos. Ohio furnace, sil. 1 to 2 per cent copper free	35.00
Silvery, sil. 8 per cent	38.53

Ferroalloys.—The market is quiet and prices are unsettled. A local company with plants in various parts of the country is inquiring for two cars of ferromanganese. One producer is quoting $85 delivered on 80 per cent material while another is asking $82.50, delivered. Eighty dollars delivered is apparently the top of the market on 50 per cent ferrosilicon. Some cheap resale material has been offered on the market at a price of as low as $72 delivered which was named on an inquiry from a melter in an adjacent territory. Norwegian material is now being quoted at $75 delivered, Pittsburgh, but has not yet made its appearance here.

We quote 75 to 80 per cent ferromanganese, $82.50 to $85 delivered; 50 per cent ferrosilicon, $80 delivered; spiegeleisen 18 to 22 per cent, $38 to $39 delivered.

Plates.—The General American Tank Car Corporation is in the market for 1600 tons of plates. Outside of this inquiry, there is little new business in sight. The stabilized quotation is being adhered to.

The mill quotation is 2.20c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.23c. for plates out of stock.

Structural Material.—Although the local building trades lockout is still in force, the prospects of a settlement grow brighter every day. In other respects, the building situation in this territory remains unchanged, while railroad awards of bridge work are light. Lettings of fabricating work include:

Chicago & Northwestern Railroad, bridges, 1800 tons, to American Bridge Co.

Illinois Central Railroad, bridges at Genoa and Hartsburg, Ill., 220 tons, to American Bridge Co.

Rio Honda bridge, Los Angeles, 266 tons, to American Bridge Co.

Store and theater, Porter & Pyle, Champaign, Ill., 250 tons to Worden-Allen Co.

High school, Ottumwa, Iowa, 150 tons, to Christopher & Simpson Iron Works.

Senior high school building, Dubuque, Iowa, 101 tons, reported awarded to Northwestern Bridge & Iron Co.

George H. J. Haas, apartment building, Chicago, 640 tons, reinforced concrete construction substituted for fabricated steel.

Repairs to Armour Grain Co., elevator, South Chicago, 100 tons to Kenwood Bridge Co.

Pending work includes:

Belle Isle bridge, Detroit, 4000 tons, bids taken for third time on May 21.

Corn Products Refining Co., buildings Nos. 1 and 2, North Kansas City, Mo., 250 tons.

Coal tipple, Dillinger, Pa., 125 tons.

Sheboygan, Wis., Bascule bridge, Sheboygan River, at Eighth Street, ordinance authorizing $200,000 bond issue now before City Council.

The mill quotation is 2.20c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.23c. for materials out of warehouse.

Bars.—In general, the market on soft steel bars remains fairly firm, but here and there prices have been shaded by some of the smaller producers. A number of orders have been taken at 1.90c., Pittsburgh, and one of 300 tons was placed by a Western company for Eastern delivery at 1.87½c. On the other hand, one local producer has booked 1000 tons for Detroit delivery at the full price of 2.10c., Pittsburgh. On the whole, business is light, but there are a few fair sized tonnages on inquiry. The contractor who is repairing the Armour Grain Co. elevator is inquiring for 117 tons of flats. For the Illinois Merchants Trust Co. building, the general contract of which is now being figured on, 1500 to 2000 tons of reinforcing bars will be required. The contract for the fabricated steel for this structure was let about 18 months ago. The demand for bar iron remains relatively light. One mill will probably shut down at the close of this week after three weeks' operation. Another bar iron plant is able to maintain operations because it alternates in rolling iron and steel. The Illinois Central has bought 100 tons of iron bars, but generally purchases by the railroads continue very light. While some business has been taken at concessions, the ruling price remains 2.38c., Chicago. Buying of hard steel bars is still far below normal, although fence post manufacturers have shown some interest in the market of late. Prices range from 2c. to 2.25c., Chicago, with a majority of orders going at the lower figure.

Mill prices are: Mild steel bars, 2.10c., Pittsburgh, taking a freight of 38c. per 100 lb; common bar iron, 2.38c., Chicago; rail carbon, 2c. to 2.25c. mill or Chicago.

Jobbers quote 3.13c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.63c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.88c. base.

Wire Products.—One producer reports that it is making widely scattered sales in the West at the full market and that price cutting has not become a factor in this territory. One jobber has put out an inquiry for 5000 kegs of wire nails, but this is regarded as a feeler to test the market and is not believed to have behind it any desire to buy. On the whole, jobbers are buying from hand-to-mouth, a policy which is justified by the prompt deliveries which are to be had from the mills. Demand from the manufacturing trade is light. A

Chicago railroad has placed a fair sized order for nails. This is thought to indicate a resumption of car repair work after the reduction in the wages of common labor becomes effective. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1423.

Rails and Track Supplies.—Although business in track supplies is slow, some new orders are being received. The leading interest has booked 1600 tons of tie plates in new business and has received fairly good specifications for tie plates, spikes, bolts and angle bars. Some railroads, however, are asking that rail deliveries be deferred with the result that rail mill operations are not so satisfactory as some weeks ago. Prices seem to be firm, except on light rails, which are being affected by the competition of rerolling mills. Rerolled light rails are now being quoted at as low as 1.90c. mill.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 2.20c. f.o.b. makers' mills. Standard railroad spikes, 3.40c., Pittsburgh; track bolts with square nuts, 4.35c., Pittsburgh; steel tie plates, 2.50c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.50c. to 3c. f.o.b. makers' mills.

Bolts and Nuts.—Buying is so light that prices have not been given a real test. There is some shading and because of the small volume of inquiry the importance of offerings of resale stocks from a Western tractor plant at considerably under manufacturers' prices is magnified. With the exception of the leading maker of cheap automobiles, car makers are buying few bolts. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1423.

Jobbers quote structural rivets, 4.53c.; boiler rivets, 4.63c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 45 off; carriage bolts up to ⅞ x 6 in., 40 off; larger sizes, 40 off; hot pressed nuts, square and hexagon tapped, $2.10 off; blank nuts, $2.60 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off. Quartity extras are unchanged.

Cast-Iron Pipe.—This market has weakened and going prices appear to fall between a range of $45 to $50, base Birmingham, for 6-in. and larger. As noted a week ago, Akron, Ohio, bought at $45, and Middletown, Ohio, is reported to have bought at approximately the same figures, while Columbus, Ohio, received a low bid of $47.75, Birmingham. There is little new work to report, but lettings are more numerous. Recent awards include:

North Platte, Neb., 280 tons to National Cast Iron Pipe Co.

Hamptrack, Mich., 125 tons to United States Cast Iron Pipe & Foundry Co.

Beaumont Gas Co., Beaumont, Texas, 500 tons of gas pipe to National Cast Iron Pipe Co.

Cambridge, Minn., 300 tons to contractor.

Janesville, Minn., 200 tons to National Cast Iron Pipe Co.

Middletown, Ohio, 471 tons to United States Cast Iron Pipe & Foundry Co.

Columbus, Ohio, 250 tons, United States Cast Iron Pipe & Foundry Co., low bidder.

New business includes:

Grand Rapids, Mich, 280 tons, bids to be taken May 26.

Sauk City, Wis., 500 tons, May 26.

Battle Creek, Mich., will take bids on a tonnage of water pipe soon.

Youngstown, Ohio, will spend $100,000 on water works improvement, tonnage of pipe to be bought not yet announced.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $59.10 to $64.10; 6-in. and above $54.10 to $59.10; class A and gas pipe, $4 extra.

Strip Steel.—Inquiries received from the automobile industry for hot-rolled strip steel aggregate 7000 tons.

Sheets.—There is little buying and prices are fairly firm. A sale of No. 28 galvanized, however, is reported to have been made at 4.75c., Pittsburgh.

Mill quotations are 4c. for No. 28 black; 3.10c. for No. 10 blue annealed and 5c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 4.13c.; No. 28 black, 5.40c.; No. 28 galvanized, 6.40c.

Old Material.—The growing aloofness of consumers has wrought a change in the attitude of dealers. Speculative buying for yard storage is no longer in full swing, and a feeling that prices must again recede is gaining ground. A large steel mill which recently bought heavy melting at $12 a gross ton delivered, has not only withdrawn from the market but has restricted shipments against contracts to four cars a day. This is a reflection on curtailed mill operation. Other users who have bought at least moderately of late have ceased buying for similar reasons. A process of adjustment must now take place before the dealers and the consumers can get together. In anticipation of a rise in prices, sellers have paid more than users were willing to offer. Thus $12.50 and $13 per gross ton have been paid for heavy melting. A local railroad sold a dealer 500 tons of rerolling rails at $14.15 or about $15.05 delivered in dealer's yards, whereas no user has paid more than $14 delivered. A dealer bought steel tired wheels with cast iron centers and sold them at a profit at $12 per gross ton to another dealer; yet no consumer has been willing to pay more than $11 for that commodity. There are practically no price changes to report this week, but declines are looked for. Railroad lists include the Burlington, 2000 tons; the Pennsylvania Northwestern Region, 1800 tons, and the Chicago Great Western, 200 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$17.50 to $18.00
Relaying rails	30.00 to 35.00
Car wheels	15.00 to 15.50
Steel rails, rerol'ing	13.50 to 14.00
Steel rails, less than 3 ft	14.00 to 14.50
Heavy melting steel	11.50 to 12.00
Frogs, switches and guards, cut apart	11.50 to 12.00
Shoveling steel	11.00 to 11.50
Low phos. heavy melting steel	14.00 to 14.50
Drop forge flashings	7.50 to 8.00
Hydraulic compressed sheet	8.00 to 8.50
Axle turnings	9.00 to 9.50
Per Net Ton	
Iron angles and splice bars	15.50 to 16.00
Steel angle bars	11.50 to 12.00
Iron arch bars and transoms	15.50 to 16.00
Iron car axles	22.50 to 23.00
Steel car axles	14.50 to 15.00
No. 1 busheling	9.50 to 10.00
No. 2 busheling	7.00 to 7.50
Cut forge	10.50 to 11.00
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.50 to 11.00
Steel knuckles and couplers	12.50 to 13.00
Coil springs	13.50 to 14.00
No. 1 cast	13.50 to 14.00
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	4.00 to 4.50
Cast borings	6.00 to 6.50
Stove plate	13.00 to 13.50
Grate bars	10.50 to 11.00
Brake shoes	11.00 to 11.50
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.00 to 12.50
Country mixed	8.50 to 9.00

New York

NEW YORK, May 24.

Pig Iron.—The market is extremely dull and in looking forward to possible business some foundrymen and sellers of pig iron are discussing the possibility of the new vehicular tunnel between New York and Jersey City, and also the proposed tunnel from Staten Island to Brooklyn becoming factors in the pig iron market. It is expected that ultimately large tonnages will be required for both of these projects. The strike of molders in New Jersey foundries has been ended by the men agreeing to return to work at a reduction from 88c. to 80c. per hr. and the union men are being allowed to return to their jobs. There is not enough work, however, to employ all of them.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$28.52 to $29.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	27.52 to 28.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	26.52 to 27.52
Buffalo, sil. 1.75 to 2.25	32.46 to 33.46
No. 2 Virginia, sil. 1.75 to 2.25	31.16 to 32.16

Warehouse Business.—The consensus of opinion among warehouses seems to be that May will prove to be the dullest month thus far. Despite efforts made by most dealers to reduce stocks to a lower level, the majority of warehouses are still well filled. Although we

quote No. 28 gage, galvanized sheets at 6c. to 6.38c. per lb., the former quotation the recent reduction of one warehouse, it is generally understood that a fair tonnage of 50 or 100 bundles will bring out a price in some quarters as low as 5.50c. per lb. A large warehouse dealing in brass and copper has reduced its prices from 1c. to 1½c. per lb. generally, and other warehouses in this line have dropped prices slightly. Wrought iron and steel pipe shows no change over the past few weeks. We quote prices on page 1440.

High Speed Steel.—A slight improvement in business from machine tool builders and textile machinery builders is noted. Prices, however, are weak, prevailing quotations on 18 per cent tungsten high speed steel ranging nominally from 90c. to $1 per lb., New York.

Ferroalloys.—The market for both ferromanganese and spiegeleisen continues lifeless. Demand for the former is confined to three or four carload lots for early delivery while for the latter very little inquiry is reported. British producers have announced that they will take business at $75, seaboard, which is equivalent to the American price of $80, delivered. There is no activity in the manganese ore nor in the 50 per cent ferrosilicon markets where quotations continue unchanged. Prices are as follows:

Ferromanganese, domestic, delivered, per ton	$80.00
Ferromanganese, British, seaboard, per ton	$75.00
Spiegeleisen, 20 per cent, furnace, per ton	$30.00 to $32.00
Ferrosilicon, 50 per cent, delivered, per ton	$80.00
Ferrotungsten, per lb. of contained metal	58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr	16c. to 16.50c.
Ferrovanadium, per lb. of contained vanadium	$5.00
Manganese ore, foreign, per unit, seaboard	22.50c.

Cast-Iron Pipe.—The Florence Cast Iron Pipe Co., Philadelphia, was lowest bidder for 1852 tons of 6, 8 and 12-in. pipe for the City of New York at a price considerably below prevailing quotations. Prices are generally $5 lower than quoted the past several weeks. Pipe manufacturers are operating at around 60 per cent of full capacity. Orders are coming from many small private companies. Some municipalities, notably in New England, are laying pipe lines to give employment to labor. We now quote, f.o.b. New York, as follows: 6-in. and larger, $58.30; 4-in., $68.30; 3-in., $78.30, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—The first definite break in steel prices since the announcement several weeks ago by the Steel Corporation and independent mills of uniform quotations came this week. A locomotive company bought 1000 tons of plates at less than 1.90c., Pittsburgh. The inquiry developed spirited competition, and while a number of mills adhered firmly to the 2.20c. price, a few were desirous enough for the business that they agreed to accept a lower figure. Only a few plate mills could supply the widest plates desired. Except for this one transaction the local steel market has had a dull week, conditions being characterized by some who are long experienced in the trade as the quietest they have ever known. Both inquiries and orders are scarce. There are few inquiries for more than a carload. The Lehigh Valley Railroad has let 1500 freight cars for repairs, 1000 to the American Car & Foundry Co. and 500 to the Buffalo Steel Car Co. There are no inquiries for new cars. Structural steel business, which showed a gain in April, is expected to register a drop in May. Very little business has been placed this month. A number of projects have been indefinitely postponed, including the Union Memorial Hospital, Baltimore, requiring 750 tons.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.48c.; plates and structural shapes, 2.58c.; bar iron, 2.28c.

Old Material.—The slight improvement in business noticed a week or so ago has fallen off, and with it prices. Mills are neither inquiring nor buying, and the market is stagnant. A broker gives the following instructions to buyers of the firm: "The market seems to be showing a little tendency to weaken; so do not purchase any large quantities without taking up with us." One dealer reports several inquiries for heavy melting steel and mixed borings and turnings from brokers.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.00 to $8.00
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	40.00 to 42.50
Steel car axles	10.50 to 11.50
Iron car axles	17.00 to 18.00
No. 1 railroad wrought	10.00 to 11.00
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 6.00
No. 1 yard wrought, long	8.00 to 9.00
Light iron	2.00 to 3.00
Cast borings (clean)	4.00 to 4.50
Machine-shop turnings	3.00 to 4.00
Mixed borings and turnings	3.00 to 3.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.50 to 8.00
Stove plate	9.50 to 10.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	8.00 to 8.50
Old car wheels	14.00 to 14.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	10.00 to 11.00
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 11.00

Birmingham

BIRMINGHAM, ALA., May 24.

Pig Iron.—Toward the close of last week the inquiry from foundries north of the Ohio became brisk for the first time in weeks. Evansville, Milwaukee, Hamilton, Ohio, and Indiana points were among those asking prices on small lots and as high as 500 tons. One maker received a number of letters from consumers, saying they were reaching bottom of their stock piles and would soon be in position to order out some held-up iron. The largest business coming to the surface was 1000 tons, which was taken by a maker with two brands of iron, one a special. There is little variance from the $23 base in the going business in small lots for prompt shipment. There is no base for large tonnages. One interest is quoting $22.50 even on small tonnages, and it is not denied that sales of 500 tons and above have been made at lower still when waiving of silicon differentials is considered. The week with the average maker was extremely dull.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$22.00
Basic	21.00
Charcoal	35.00

Finished Material.—The Gulf States Steel Co. is on a 50 per cent operating basis, with all departments going. Nails are the leading item in current business, with barbed wire next. The Tennessee Coal, Iron & Railroad Co. operated its rail mill this week, following orders for export. The Tennessee company's finishing mill operation is about 50 per cent. The Chickasaw Shipbuilding & Car Co.'s pressed steel car works will begin operations June 15. Northern mill agents report steel pipe as most actively inquired for by the Southern trade.

Cast Iron Pipe.—Outside of the 950-ton order for Akron, taken by the National Cast Iron Pipe Co., no large pipe orders have been received in high pressure circles. The base is $45 to $50, according to desirability of business. Soil pipe factories that resumed have piled large amounts of pipe and the Gadsden shops shut down. The production failed to be absorbed. The base is $45.

Coal and Coke.—Seaboard Air Line has awarded year's contract for 780,000 tons of coal to the Pratt Consolidated Coal Co., Empire Coal Co., Bankhead Coal Co. and others, delivery effective from July 1. Alabama mines got more of this business than usual. The Louisville & Nashville awarded Alabama 500,000 tons. The trade is quoted best coals at $3.35 to $4 by car load f.o.b. mines, railroads getting theirs for less under sharp competition. Standard foundry coke has sold at $6.50. The general price is $7. One maker of silvery gray holds for $9.

Old Material.—The scrap market has sought new low levels, with very little new business. Almost all grades have been marked down.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Old steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	16.00 to 17.00
Car wheels	16.00 to 17.00
Tramcar wheels	15.00 to 16.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Cincinnati

CINCINNATI, May 23.

Pig Iron.—There has been very little activity during the past week, carload sales predominating. The 600-ton inquiry for the American Radiator Co.'s Detroit plant is still pending and one for 100 tons of Southern iron has been received. A tentative inquiry for 300 tons for shipment during the last half is also reported. Sales reported include two lots of low phosphorus aggregating 250 tons, which went at $36.50 furnace. A carload sale of re-sale silvery iron is reported to have been made at $34, delivered. Southern Ohio iron is now definitely on a $24 basis, and carload sales have been made at this figure. The quoting by Southern furnace of $22, Birmingham, is more general, but some carload sales were made during the week at $23. Shipments on contracts, which showed improvement during the early part of the month, declined considerably during the past week, a falling off in the demand for castings from automobile manufacturers being given as the reason for suspending shipments.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.50
Ohio silvery, 8 per cent sil	41.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	26.52 to 27.52
Basic, Northern	25.52
Malleable	26.52

Finished Material.—Orders for finished materials are extremely light, being confined to carload lots and less than carload lots for immediate delivery. Rumors are heard of lower prices being quoted on various steel products, but when traced down these are found to originate from offerings of resale tonnages bought at the low prices in effect before the present stabilized prices were announced. Some buyers are apparently willing to take small tonnages if concessions from stabilized prices will be made, as was evidenced by a jobber making an offer of 2c. on steel bars. The offer, however, was refused by the company to which it was sent. Wire nails are being quoted in the market at $3 per keg base and several mills represented in the Cincinnati district are reported to be making a price of $3 per keg, f.o.b. mill. There is very little activity in the structural field, the largest projects coming up at the present time calling for less than 100 tons. The Borderland Coal Co. will erect a bridge for coal conveying purposes over the Tug River in West Virginia. This will probably take 150 tons of structural steel.

Cast-Iron Pipe.—The city of Middletown, Ohio, has awarded to the United States Cast Iron Pipe & Foundry Co. 360 tons of 6-in. water pipe and 106 tons of 10-in. water pipe. The price on the 6-in. pipe was $52.01, f.o.b. Middletown and on the 10-in. pipe, $52.23, f.o.b., Middletown. The city also purchased 75 tons of slightly used pipe at $45 delivered to Middletown. It is not known whether this pipe will be shipped from Birmingham, Ala., or Addyston, Ohio. The freight rate from Birmingham to Middletown is $7.33½ per net ton and from Addyston, $2.56 per net ton.

Warehouse Business.—Warehouse business is reported as very light. Increased activity is noticed in wire nails, however, but other wire products are very quiet. No price changes have been made, although it is rumored that the quotation on wire nails will be considerably reduced within the next week or so. Local jobbers continue to quote:

Iron and steel bars, 3.35c. base; hoops and bands, 4.05c. base; shapes, 3.45c. base; plates, 3.45c. base; reinforcing bars, 3.42½c. base; cold rolled rounds, 1½ in. and larger, 4.85c.; under 1½ in. and flats, squares and hexagons, 5.35c.; No. 10 blue annealed sheets, 4.35c.; No. 28 black sheets, 5.50c.; No. 28 galvanized sheets 6.50c.; wire nails, $3.60 to $3.85 per keg base; No. 9 annealed wire, $3.60 per 100 lb.

Coke.—An inquiry for 2300 tons of coke for last half shipment to Michigan brought a quotation of $5 Connellsville ovens. Another inquiry for 1000 tons for shipment to Wisconsin is being figured on. Carload business is slightly heavier, though the market generally is reported as weak. Connellsville furnace coke is quoted at $3.50 and guaranteed foundry at $5, Wise county $6 to $7 and New River $9. By-product furnace coke is quoted at $5 and foundry at $7.

Old Material.—There have been no developments in the scrap market, and a waiting policy is being maintained. Activity is confined almost entirely to filling old contracts, though an occasional carload sale is reported.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$7.50 to $8.50
Iron rails	16.50 to 17.50
Relaying rails, 50 lb. and up	30.50 to 31.50
Rerolling steel rails	11.50 to 12.50
Heavy melting steel	10.00 to 11.00
Steel rails for melting	10.50 to 11.50
Car wheels	14.00 to 15.00
Per Net Ton	
No. 1 railroad wrought	10.00 to 11.00
Cast borings	5.00 to 5.50
Steel turnings	3.50 to 4.00
Railroad cast	13.50 to 14.50
No. 1 machinery	13.50 to 14.50
Burnt scrap	8.00 to 9.00
Iron axles	20.00 to 20.50
Locomotive tires (smooth inside)	10.00 to 11.00
Pipes and flues	7.50 to 8.00

Boston

BOSTON, May 24.

Pig Iron.—Sales this week were approximately 500 tons and included one 200-ton lot of Eastern Pennsylvania, silicon 2.25 to 2.75, to a Massachusetts foundry at $29.25 furnace, 100 tons No. 2X eastern Pennsylvania resale at about $30 delivered, 100 tons high manganese Virginia to a Massachusetts melter at private terms, 100 tons No. 2X Virginia to a Connecticut consumer at around $27 furnace, and one car eastern Pennsylvania No. 1X to a nearby foundry at about $31 delivered. All iron sold was for delivery before July 1. Although new inquiries involve but 150 to 200 tons, sentiment among foundrymen appears more optimistic and the industry as a whole is operating between 20 and 30 per cent, as against 15 per cent three months ago. With the exception of one foundry at Framingham, Mass., no trouble has been experienced by the recent reduction in molders' wages to $6.25 a day. The Framingham molders struck, but the plant is operating with non-union help. A Portland, Me., interest wants bids on one car of iron high in silicon and low in carbon and sulphur, used as ballast. Delivered pig iron prices follow:

East. Penn., sil. 2.25 to 2.75	$28.56 to $29.06
East. Penn., sil. 1.75 to 2.25	27.56 to 28.06
Buffalo, sil. 2.25 to 2.75	30.46 to 34.71
Buffalo, sil. 1.75 to 2.25	29.46 to 33.46
Virginia, sil. 2.25 to 2.75	32.58 to 35.83
Virginia, sil. 1.75 to 2.25	31.58 to 34.58
Alabama, sil. 2.25 to 2.75	34.91 to 36.91
Alabama, sil. 1.75 to 2.25	33.66 to 35.66

Finished Material.—Building figures compiled by various services largely concern private houses, garages, schools, etc., but practically nothing involving the use of structural steel in sizable tonnages. Consumption of bars, plates, bolts, nuts and similar steel products is limited and buyers' wants for the next month or so are understood to have been covered before the recent readjustment of mill quotations. In the absence of new business, mill prices remain mostly nominal. No increase is reported in the movement of iron and steel out of local warehouses. Individual orders placed are for very small amounts. Reports of lower prices for steel products at other points have had no influence on local values.

Jobbers now quote: Soft steel bars, $3.18 per 100 lb. base; flats, $4.18 to $4.28; concrete bars, $3.18 to $3.45½; tire steel, $4.25 to $4.75; spring steel, open hearth, $5.50; crucible, $11.50; steel bands, $3.83 to $4.48; steel hoops, $4.38; toe calk steel, $5.25; cold rolled steel, $4.65 to $5.15; structural, $3.18 to $3.28; plates, $3.28 to $3.50; No. 10 blue annealed sheets, $4.53; No. 28 black sheets, $5.85; No. 28 galvanized sheets, $6.85; refined iron, $3.18 to $5; best refined, $5; Wayne iron, $8.50; Norway iron, round, ¼-in. to 2½-in., 8c. per lb. net; other sizes, 10c. base.

Coke.—The past day or two there has been an increase in the movement of foundry coke from the ovens, according to the New England producers, but the improvement is slight and represents little new business. Both the New England Coal & Coke Co. and the Providence Gas Co. quote spot coke at $11.66 delivered, where the freight does not exceed $3.40 a ton. The contract market is purely nominal at $11.41 delivered. Both companies are expected to name last half contract prices within a fortnight. Connellsville foundry

coke is still obtainable at $5 to $5.50 f.o.b. ovens, but few actual sales are reported.

Old Material.—Consumption of machinery cast and stove plate continues on a comparatively small scale, consequently foundry stocks have not shrunk sufficiently to warrant any increased buying of such scrap. The best secured for strictly No. 1 machinery cast of late is $19 delivered, with a majority of transactions at $18 to $18.50. One Pennsylvania mill remains willing to pay $12 delivered for heavy melting steel. Holders usually are not anxious to sell on that basis, however. The inactivity of New England machine shops and manufacturing establishments has materially reduced offerings of borings, turnings and other materials, yet local yard stocks have shown a steady increase this month. This probably is due to dealers' purchases of street and steam railroad offerings. The Boston & Maine Railroad Co. this week opens bids on 62 cars of old material. The Boston Elevated Railway Co. recently sold a round tonnage of car wheels and axles. Rerolling rails are easier, but just how much so is difficult to say, due to the lack of demand. It is doubtful whether better than $8.50 could be obtained to-day. Local yard prices on old material, per gross ton, follow:

No. 1 heavy melting steel	$7.00 to	$7.50
No. 1 railroad wrought	10.00 to	11.00
No. 1 yard wrought	8.00 to	9.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	7.00 to	8.00
Machine shop turnings	3.00 to	3.50
Cast iron borings, rolling mills	3.50 to	4.00
Cast iron borings, chemical	3.50 to	4.00
Blast furnace borings and turnings	3.00 to	3.50
Forged scrap and skeleton	4.50 to	5.00
Street car axles and shafting	12.00 to	13.00
Car wheels	15.00 to	16.00
Machinery cast	16.00 to	18.00
No. 2 cast	14.00 to	15.00
Stove plate	11.00 to	12.00
Railroad malleable	10.00 to	10.50
Rerolling rails	8.00 to	8.50

St. Louis

ST. LOUIS, May 24.

Pig Iron.—There are increasing signs of renewed interest in the pig iron business in this market, but the aggregate of business which is being actually transacted is still small. During the past week, there was a sale of 500 tons of basic for special uses, for prompt shipment, and inquiry for 500 tons of carwheel iron, together with inquiries for small lots, 100 tons and less; also a small number of sales of small tonnages for early delivery. Generally speaking, the pig iron representatives are assuming a more hopeful frame of mind and look forward to more satisfactory business with the coming fall and a steady development up to that time through the summer. The jobbing foundries seem a little more active, while the stove foundries are swinging into line slowly with increased production. No Southern iron is being sold here, as it cannot compete with the local or the Northern furnaces. The sales the past week have ranged from $27 to $28 delivered in St. Louis and No. 2 Southern would have to be sold well below $23, Birmingham, to meet this figure.

Coke.—There is a little inquiry for coke, but no large lots are included in the call for metallurgical coke. The prices prevailing range from $5 to $6.50 per ton at the oven for the best 72-hour selected Connellsville coke for prompt delivery and slightly higher for future delivery.

Finished Iron and Steel.—In the finished products market, there is a more hopeful feeling and some improvement in the tonnage that is moving both under specifications on old contracts and on new business. However, the aggregate is still low and likely to remain so until toward fall. At that the trade is feeling more encouraged. In the warehouse section there is also an evidence of slight improvement in the fact that sales and deliveries show some increase from week to week, but there is much yet to be gained in this division of the market to put it on a satisfactory basis.

For stock out of warehouse we quote as follows: Soft steel bars, 3.22½c.; iron bars, 3.22½c.; structural material, 3.32½c.; tank plate, 3.32½c.; No. 10 blue annealed sheets, 4.22½c.; No. 28 black sheets, cold rolled, one pass, 5.50c.; No. 28 galvanized sheets, black sheet gage, 6.50c.

Old Material.—The scrap market is absolutely without feature, no transactions taking place and no disposition appearing among consumers to consider buying. The dealers are indulging in no trading among themselves while those with yards have completely ceased laying down even bargains that appear. The railroads have made no offerings since the first of the month except a small list of 300 tons from the Cotton Belt and some carload lots from the Missouri Pacific.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton		
Iron rails	$13.00 to	$13.50
Steel rails, rerolling	12.50 to	13.00
Steel rails, less than 3 ft.	12.00 to	12.50
Relaying rails, standard section, subject to inspection	27.50 to	32.50
Car wheels	12.50 to	13.00
No. 1 railroad heavy melting steel	12.00 to	12.50
Heavy shoveling steel	10.50 to	11.00
Ordinary shoveling steel	10.00 to	10.50
Frogs, switches and guards cut apart	12.00 to	12.50
Ordinary bundled sheet	5.00 to	5.50
Per Net Ton		
Heavy axle and tire turnings	5.00 to	5.50
Iron angle bars	10.50 to	11.00
Steel angle bars	10.25 to	10.75
Iron car axles	20.50 to	21.00
Steel car axles	14.00 to	14.50
Wrought arch bars and transoms	14.00 to	14.50
No. 1 railroad wrought	10.50 to	11.00
No. 2 railroad wrought	9.50 to	10.00
Railroad springs	10.50 to	11.00
Steel couplers and knuckles	10.50 to	11.00
Locomotive tires, 42 in. and over, smooth inside	9.00 to	9.50
No. 1 dealers' forge	7.00 to	7.50
Cast iron borings	6.50 to	7.00
No. 1 busheling	10.50 to	11.00
No. 1 boilers, cut to sheets and rings	6.00 to	6.50
No. 1 railroad cast	12.00 to	12.50
Stove plate and light cast	11.00 to	11.50
Railroad malleable	9.50 to	10.00
Agricultural malleable	10.00 to	10.50
Pipes and flues	7.00 to	7.50
Railroad sheet and tank	5.00 to	5.50
Railroad grate bars	7.00 to	7.50
Machine shop turnings	5.00 to	5.50
Country mixed	7.00 to	7.50
Uncut railroad mixed	8.00 to	8.50
Horseshoes	11.00 to	11.50
Railroad brake shoes	8.00 to	8.50

Buffalo

BUFFALO, May 24.

Pig Iron.—Several sellers of pig iron feel more optimistic with reference to coming business than has been manifest in recent months. Two sellers, however, are practically out of the market—one withdrawing because it cannot compete at prices now being quoted and the other because the price policy will not enable it to get business. A producer whose plant is not solely engaged in making iron, will not attempt to sell iron until some stabilized basis is reached. A total volume of inquiry amounting to 4000 tons is in the hands of one producer who is quoting $25—a departure from a policy maintained for many months. Since the announcement of its desire to take business at $25 it has sold several hundred tons. Considerable inquiry reaching this producer is from outside the district and cannot be developed into sales because of prohibitive freight rates. May is expected to show better shipping on old contracts than any month this year, in one office, which reports total sales approximating 1700 tons at $25 base. This producer is operating the largest furnace in this district and expects to continue operation on the present volume of sales. There is a growing inquiry for last quarter, but local concerns will not quote for such delivery.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$26.00 to	$27.00
No. 2X foundry, 2.25 to 2.75 sil.	25.00 to	26.00
No. 2 plain, 1.75 to 2.25 sil.	24.00 to	25.00
Basic (nominal)	23.00 to	24.00
Malleable (nominal)	24.00 to	25.00
Lake Superior charcoal		38.00

Finished Iron and Steel.—Business growing out of new construction is the only sign of activity in this market. Road construction in New York and Pennsylvania, and local building activity are the two factors which save this market from complete stagnation. Pipe, both black and galvanized, and for use in plumbing and house construction, is in good demand, but

sheet, plate and bar business is at a standstill. The 65 per cent of operation which a wire interest has steadily maintained will grow to 80 per cent within 30 days. This maker has made and shipped more wire cloth this year than in any corresponding period in its history. One sales office states conditions are very bad, but that inquiry in the two last days of the week brightened. Prices continue to hold; the only break noticed is on wire nails, which are reported to have been shaded. Construction work which will involve much tonnage in steel is definitely planned, but is a long way from the contract stage. A steel and concrete bridge to span the Genesee River at Rochester, said to be the largest single span structure in the world; the new Ellicott Club at Buffalo, and a modern office building to be erected by the Masonic order in Buffalo, show a lively program for 1921 and 1922. A new university building for Cornell University at Ithaca, N. Y., requiring both structural material and reinforcing bars, is interesting local agencies. A large steel interest plans increased operating in June in all departments, which will bring its activities to about 50 per cent of normal. A sheet maker who has maintained an operating schedule of one-half normal does not expect to continue more than two weeks. All business seems to be conditional on immediate delivery—there is no demand for future business.

Warehouse Business.—The volume of orders has not changed in several weeks. Structural business from points in central New York and Rochester has fallen off, due to labor trouble. There is no betterment in tonnages asked for.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.25c.; plates, 3.25c.; plates, No. 8 gage, 4.10c.; soft steel bars and shapes, 3.15c.; hoops, 3.85c.; blue annealed sheets, No. 10 gage, 4.15c.; galvanized steel sheets, No. 28 gage, 6.30c.; black sheets, No. 28 gage, 5.30c.; No. 9 gage annealed wire, 4.35c.; cold rolled strip steel, 8.15c.

Old Material.—A majority of the dealers are still working on orders for heavy melting steel recently placed by a railroad equipment maker. The price is $13 delivered the plant just outside Buffalo. Some of the dealers are said to have paid $13 and turned the material over without gain. Some small sales of No. 1 machinery cast are reported. Prices remain steady. One of the largest buyers of steel is reported as ready to come into the market after a long absence. One dealer anticipates a drop in prices within 60 days and generally poor business throughout the summer.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$12.50 to $13.00
Hydraulic compressed	9.00 to 9.50
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	13.00 to 14.00
Car wheels	16.00 to 17.00
Railroad malleable	11.50 to 12.50
Machine shop turnings	7.00 to 8.00
Heavy axle turnings	10.00 to 11.00
Clean cast borings	7.00 to 8.00
Locomotive grate bars	11.50 to 12.50
Wrought pipe	9.50 to 10.50
No. 1 busheling	9.50 to 10.50
Stove plate	15.00 to 16.00
Bundled sheet stampings	7.00 to 8.00
No. 1 machinery cast	18.00 to 18.50

Philadelphia

PHILADELPHIA, May 24.

The most interesting market development of the week is the breaking away by a few Eastern mills from the 2.20c. plate price, which was generally adopted by the independent companies and the Steel Corporation several weeks ago. At least one or two mills will now quote 2c., Pittsburgh on desirable specifications of sheared and universal plates. One mill which has broken away from the 2.20c. price has apparently not gone as low as 2c., but is reported to have quoted 2.15c. and then 2.10c. on some inquiries. The reduced prices have brought a slight increase in orders to the mills making them, but the business is made up of small lots.

Pig iron shows further weakness, No. 2X iron being available at $24.50 to $25, furnace. A sale of 2500 tons of No. 3 iron to a pipe manufacturer is believed to have been made at about $22 to $23, furnace.

Makers of bar iron have announced a reduction from 2c. to 1.90c. per lb., Pittsburgh.

Pig Iron.—Pipe makers are the principal buyers of foundry iron. The most recent sale involves 2500 tons of No. 3 grade. Though details of the transaction are not reported, it is believed the business was taken at about $22 or $23, furnace. There is an inquiry for 500 tons of malleable iron. Prices of foundry iron are weak, No. 2 plain being available at $24, furnace, and No. 2X at $24.50 to $25, furnace, with every indication that even lower prices would be named on desirable tonnages. There are many irregularities in present prices, each transaction, to a certain extent, being a law unto itself. Practically no Virginia iron is coming into this distrct because of the high freight rate. Virginia furnaces are naming $26 on No. 2 plain and $27 and $27.25, f.o.b. furnace, on No. 2X, but a tonnage of the latter grade is reported to have been bought recently by a pipe interest at $25, furnace. The Princess furnace is now in blast. Two eastern Pennsylvania furnaces will be in blast shortly, Robesonia and Hellertown.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25	$24.75 to $25.25
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.50 to 26.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.74
Virginia No. 2X, 2.25 to 2.75 sil.	32.99
Basic deliv. Eastern Pa.	25.00
Gray forge	25.26
Standard low phos. (f.o.b. furnace)	38.00
Malleable	28.00 to 29.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Eastern makers now quote $85, delivered, on ferromanganese. A West Virginia steel company is reported to have bought a resale lot at $77.50, delivered. There is not sufficient business in spiegeleisen to determine the market price, but $32, furnace, or less could be done.

Coke.—Furnace coke is available for prompt shipment at $3.25, Connellsville. There is no demand for contract coke, but quotations would probably be $3.40 to $3.50, Connellsville. Foundry coke is selling at $5 to $5.50, Connellsville.

Semi-Finished Steel.—There is little interest in billets, which are available at $37, Pittsburgh, for rerolling quality and $42, Pittsburgh, for forging quality.

Plates.—The largest inquiry on which Eastern plate mills have quoted in some weeks was that of the American Locomotive Co., New York. The order for 1000 tons is reported here to have been placed below 1.90c., Pittsburgh, but whether the business was taken by an Eastern mill has not been made known. Before this particular transaction was closed, Eastern mills had begun cutting the 2.20c. price, which was adopted generally by independent companies and the Steel Corporation several weeks ago. This cutting first developed more than a week ago, at first the cuts being $1 and $2 a ton, but within the past few days orders have been placed at 2c., Pittsburgh, on comparatively small tonnages. At least two mills have gone as low as 2c. and a third has quoted at least as low as 2.10c. The mills naming 2c., Pittsburgh, are doing so only on desirable specifications, universal mill sizes being given preference. In sheared plates the rolling would have to be attractive from a mill viewpoint and the tonnage of fair size to command the 2c. price. On universal mill sizes, a single carload has been taken at 2c. A slight increase in orders has been booked by the mills making these lower prices, but small lots predominate. Some of the larger independent mills declare no intention of meeting the cuts of their competitors at present, at least. The Eastern plate market may now be quoted at 2c. to 2.20c., Pittsburgh.

Structural Material.—Continuance of the strike of the local building trades has held up practically all work that was pending. May lettings of structural jobs have not totalled as large in tonnage, apparently, as those of April. Plain material appears to be firm at 2.20c., Pittsburgh.

Bars.—Eastern bar iron makers have reduced their quotation from 2c. to 1.90c., Pittsburgh, a cut of $2 a ton, and have booked a fair amount of business at the

new price, particularly where bar iron can be substituted for steel bars, which are now $4 a ton higher. The demand for steel bars is exceedingly light.

Sheets.—Though blue-annealed sheets are firmly held in this district at 3.10c., Pittsburgh, some weakness in galvanized and black sheets is reported, but definite information of sales at cut prices is lacking. The nominal prices are 4c. for black and 5c. for galvanized, f.o.b., Pittsburgh.

Warehouse Business.—Local jobbers report May as the best month of this year, but the amount of business being done is still far from normal. We quote for local delivery as follows, there being $3 a ton reduction for shipment outside of the immediate Philadelphia district:

Soft steel bars and small shapes, 3.20c.; iron bars (except bands), 3.20c.; round edge iron, 3.50c.; round edge steel, iron finish, 1½ in. x ½ in., 3.50c.; round edge steel, planished, 4.25c.; tank steel plates, ¼-in. and heavier, 3.30c.; tank steel plates, 3/16-in., 3.55c.; blue annealed steel sheets, No. 10 gage, 4.20c.; light black steel sheets, No. 28 gage, 4.75c. to 5c.; galvanized sheets, No. 28 gage, 5.75c. to 6c.; square twisted and deformed steel bars, 3.20c.; structural shapes, 3.30c.; diamond pattern plates, 5.25c.; spring steel, 5.00c.; round cold-rolled steel, 4.60c.; squares and hexagons, cold-rolled steel, 5.10c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.85c.; iron bands, 4.50c.; rails, 3.20c.; tool steel, 12c.; Norway iron, 8c.; toe steel, 4.50c.

Old Material.—While the market as a whole continues very quiet, there has been inquiry for a few grades, but no very important sales have been made. A large inquiry for car wheels developed the fact that none was available below $18, delivered, while some dealers having wheels in stock wanted $19. A central Pennsylvania steel company came into the market for clean cast borings, offering $9.50, an advance of $1 over the minimum price regarded as representing the market a week ago. Weakness appears, however, in some grades, No. 1 railroad wrought having been offered by dealers at $15; pipe at $12.50. Rerolling rails are to be had at $15 to $15.50. We quote for delivery in consumers' yards in this district as follows:

No. 1 heavy melting steel	$12.00 to $12.50
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	18.00 to 19.00
No. 1 railroad wrought	15.00 to 16.00
No. 1 yard wrought	14.00 to 15.00
No. 1 forge fire	10.00 to 11.00
Bundled skeleton	8.00 to 8.50
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	7.50 to 8.00
Machine-shop turnings (for rolling mill and steel works use)	8.50 to 9.00
Heavy axle turnings (or equivalent)	10.00 to 11.00
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	10.50 to 11.50
No. 1 cast	18.00 to 19.00
Railroad grate bars	13.00 to 13.50
Stove plate (for steel plant use)	13.00 to 13.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Iron car axles	No market
Steel car axles	No market

Cleveland

CLEVELAND, May 23.

Iron Ore.—The conference between the officials of the Northern railroads and representatives of ore firms, to discuss the rail rate situation held in Cleveland May 18, failed to bring out any definite results, and unless later developments lead to a change in the plans the question of rates will have to be settled by the Interstate Commerce Commission. The hearing on the complaint filed by the Lake Superior Iron Ore Association, asking for a reduction in rates, which was to take place in Chicago May 31, has been postponed and the ore shippers are insistent that an early date be set for this hearing. At the Cleveland meeting, which was attended by presidents and other high executives, each side discussed the ore rate situation from its own standpoint, but the railroads failed to offer any reduction from the present rates.

With June near at hand there are as yet no signs of an ore buying movement and shipments continue very light. With the passing of another month without an improvement in the iron and steel situation ore men have lopped off another 5,000,000 tons from the expected season's movement and now place their estimates at 25,000,000 tons. Many consumers having no time contracts have arranged with shippers to take no ore this year. Out of 369 lake freighters, not including Canadian boats, only 181 are in commission and no improvement in the situation is expected within the next few weeks.

Vessel rates on ore have been fixed for this season at 80c. a ton from the head of the lakes to Lake Erie ports, or 30c. a ton lower than prevailed last year. The new rates are the same in effect in 1919. The rates will be 72c. from Marquette and 60c. from Escanaba to Lake Erie ports, and 48c. from Escanaba to Chicago. The naming of these rates removes one uncertain factor in determining ore prices for the season. Ore consumers will be given the benefit of the reduced vessel rates in addition to such additional reduction in ore prices as sellers decide to make.

We quote delivered lower lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesabi Bessemer, $7.20; Mesabi non-Bessemer, $6.55.

Pig Iron.—The market has been duller during the past week than for some time. One producer reports sales aggregating 800 tons, including one 200-ton lot and the remainder in car lots as compared with total sales of 2000 tons during the previous week. Other sales have been limited to car lots. Most sales have been made at $23.50 for No. 2 foundry, but one lot is reported to have been taken at $23.25. The market is not firm and an inquiry for a fair lot would probably bring out a $23 price. The only inquiries of any size pending are one from Indiana for 300 tons of foundry iron and another from a Pittsburgh district sanitary interest for 500 tons of foundry iron, both for early shipment. May shipments will show a fair gain over April, but sellers look for a falling off during June unless the volume of prompt shipment sales increases, as shipping orders for next month are at present light. Some foundries in this territory are making castings for the Ford Motor Co., but are required to take iron from the Ford blast furnace to make these castings. Consequently, they are not taking iron on old priced contracts with other producers.

We quote delivered Cleveland as follows, based on the new freight rates, these being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$23.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$25.00 to 25.50
Southern fdy., sil. 2.25 to 2.75	29.92 to 32.92
Ohio silvery, sil. 8 per cent	41.86
Standard low phos., Valley furnace	40.00

Finished Iron and Steel.—The volume of business in all finished lines is as light as it has been at any time in the past few months. Structural material in small lots is in better demand than plates and bars. Prices on all lines are being maintained. The slump in the automotive industry is beginning to be felt in the demand for steel from that source in that some of the Detroit motor-car builders who have completed their specifications for May are not ordering steel for June shipment. The Ford Motor Co., which recently purchased steel for its June requirements, is expected to come into the market again shortly for material for July. Structural work continues quiet, awards being limited to small lots mostly for school buildings. The only new project of size that has come up is the stadium for Ohio State University, Columbus, requiring 3000 tons of structural steel, for which bids are to be asked shortly. The Baldwin reservoir, Cleveland, requiring 1700 tons of soft steel reinforcing bars, has not yet been awarded. On hard steel reinforcing bars, 1.90c. is now the generally recognized market price for car lots, and on hard steel angles 2c.

Cleveland warehouses quote steel bars and small shapes at 2.99c.; plates, 3.09c.; structural shapes, 3.09c.; No. 9 galvanized wire, 4.45c.; No. 9 annealed wire, 3.75c.; No. 28 black sheets, 4.80c.; No. 28 galvanized, 5.70c.; No. 10 blue annealed, 3.85c. to 4c.; hoops and bands, 3.69c.; shafting, 4.25c.

Sheets.—The volume of orders for sheets is very light and confined to small lots for immediate needs. Mill prices are generally being maintained, except possibly on galvanized sheets. On these there is evidence that a $2 price concession can be secured. However, the entire sheet market is still unsettled because of offerings by brokers and others at concessions. In Detroit a jobber is reducing his stock by quoting lower than mill prices.

Coke.—Sales of foundry coke continue light and many consumers have fair stocks on their yards. Prices are unchanged at $5 to $6 per net ton for standard Connellsville foundry coke for prompt shipment.

Bolts, Nuts and Rivets.—The demand for bolts and nuts continues very light but the price is apparently firm, there being no reports of shading. Makers of semi-finished hexagon nuts report a slight improvement in orders, but these are only for small lots to fill in. Reports indicate that jobbers' stocks are getting very low. In some cases, jobbers are exchanging stocks instead of placing new orders. Following further price reductions on rivets by some of the Pittsburgh manufacturers, local prices have settled down to the same basis, or 3.25c. for structural rivets and 3.35c. for boiler rivets for car lots, but the market is weak and it is very probable that these prices would be shaded for a desirable order.

Old Material.—One local interest which has been buying mixed borings and short turnings for its blast furnaces is now out of the market and this grade is slightly weaker. Dealers are offering $8.25 for borings and turnings to fill orders. Heavy melting steel is a little firmer. A Cleveland mill is buying small lots of this grade in best quality material at $12 to $12.50. Local dealers have attempted to buy heavy melting steel in Detroit at $13 delivered, Pittsburgh, but without success, as the freight rate is $4.76. Most local dealers now have their yards well filled with scrap and do not care to add to their stocks.

We quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$11.50 to $12.00
Steel rails under 3 ft	13.50 to 14.00
Steel rails, rerolling	15.00 to 16.00
Iron rails	13.00 to 14.00
Iron car axles	20.00 to 21.00
Low phosphorus melting scrap	14.00 to 15.00
Cast borings	8.00 to 8.25
Machine shop turnings	6.50 to 7.00
Mixed borings and short turnings	8.00 to 8.25
Compressed steel	10.00 to 10.50
Railroad wrought	12.00 to 13.00
Railroad malleable	13.00 to 14.00
Light bundled sheet stampings	5.00 to 6.00
Steel axle turnings	10.00 to 10.50
No. 1 cast	18.00 to 19.00
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	13.50 to 14.00
Stove plate	13.50 to 14.00
Pipes and flues	7.00 to 8.00

MACHINE TOOLS FOR SWEDEN

Inquiry Covers 142 Machines for Railroad—Japan Buys Bridge—High French Tariff

NEW YORK May 24.—The export situation continues dull although there is evidence of better inquiry both from the Far East and European markets. A recent inquiry from European sources for machine tools calls for about 142 machines for shops of a railroad in Sweden. A similar inquiry which may be from the same source is in the hands of another dealer and was mentioned in THE IRON AGE, May 12. The order will probably total in the neighborhood of $800,000 to $900 000 if it is placed in the United States. For India, a New York exporter has submitted bids on 1400 steel telegraph poles.

Inquiries for light gage sheets continue to be received from Japan, but as a rule these inquiries seldom exceed 50 tons. Among recent orders from Japan was a tonnage of 430 tons of bridge material, A. S. T. M. specifications, which was placed with Takata & Co., 50 Church Street, New York. Some small orders have also been placed with exporters for 60-lb. rails; one of these totals two miles and another calls for three miles. A fair-sized inquiry now in the market specifies 300 tons of channels and 900 tons of ship plates to Lloyd's specifications for a Japanese shipyard.

The new French tariff, which was effective May 1, on importations, affects among various commodities, machine tools, upon which there is a specific duty of 40 fr. to 200 fr. x 3, depending upon the estimated value of the machine. This represents about a 62.5 per cent increase over the duty of 15 to 75 fr. x 3 prevailing on April 1, 1921, and about an 82.5 per cent increase over the 1914 tariff. About the same percentage of increase stands in other items listed.

Iron and steel ingots now receive an 18 fr. duty per ton, against 6.75 fr. both in April and in 1914, and blooms have been raised to 10 fr. duty against 7.50 fr. in April and in 1914. Duties on iron and steel bars, 3 mm. and larger, have been increased from 9.75 fr. in April and in 1914 to 26 fr. per ton. Iron and steel plates, which were 9.75 fr. to 19 fr. in 1914 and were reduced to 9.25 fr. to 19 fr. which prevailed on April 1, have been increased to 26 fr. to 52 fr. per ton. Iron and steel sheets have been increased from 10.50 fr. to 26 fr. per ton to 28 fr. to 68 fr. per ton. Wire has been increased from 10.50 fr. to 65 fr. per ton, the duty on April 1, to 28 fr. to 200 fr. per ton, and rails now receive a duty of 24 fr. to 40 fr. against a former duty of 9 fr. to 15 fr. per ton.

While the new tariff law of France represents a rather drastic increase over the former tariff, according to the French Economic Commission, 65 Broadway, New York, the duty on most products against Germany is about 50 per cent higher. A large free list prevails on the tariff with Italy and with Spain.

ITALIAN METAL MARKET

No Buying at Milan Fair—Railroad Purchases Confined to Italy

MILAN, ITALY, May 8.—The main occurrence last week was the opening of the Fiat works in Turin where about 5000 workmen returned. This was a labor defeat and is certainly a good sign.

Buying is still very slack. This holds good also for manufactured articles. There was practically no buying during the Milan exhibition, whereas last year contracts were closed for over one milliard lires. Everyone expected to make sales, as lots of goods, especially from Germany, Austria and Hungary, were sent here to be sold during the exhibition, among these many articles of forbidden importation, but which under one of the clauses of the exhibition were allowed to be imported and sold.

Italian Railroad Purchases

The Italian Government has placed several orders with the various Italian locomotive works for both steam and electric locomotives. One of the clauses states that all raw materials and parts must be manufactured in Italy. When the price of foreign merchandise was 5 per cent lower than that of the Italian manufacturers, the works could place their orders with a foreign firm, subject, however, to the Italian State railroad inspection, but now this order has been suspended and all material must be bought in Italy.

Small Demand for Pig Iron

There has been a small demand for American foundry pig iron. French foundry iron No. 2 is quoted here at 550 lires per ton free on cars. American iron dealers must figure on a charge of about 75 lires per ton for unloading at Genoa and to cover present duty. There is no demand for hematite, as there are plenty of stocks on hand.

Several Italian foundries have, during the war, installed electric furnaces and in this way use up their own scrap or purchase scrap iron instead of pig iron.

Here are this week's prices in lires, f.o.b. Milan per 100 kg.:

	March 19	April 17	May 7	Cents per Lb. May 7
Copper, electrolytic	725	630	625	15.82
Copper sheets	1200	1100	1050	26.57
Brass sheets	1100	970	950	24.00
Brass wire	1075	950	925	23.40
Brass rods	620	580	575	14.55
Brass tubes	1250	1150	1125	28.46
Black sheets base, 4 mm	200	160	160	4.05
Galvanized sheets, No. 20	320	285	270	6.83
Tin plate, standard, per case	230	215	185	$10.30

BELGIAN MARKET IMPROVES

Bar Prices Stiffen—Wire Fencing and Rails Active—$41,850,000 Antwerp Harbor Project

BRUSSELS, BELGIUM, May 4.—It is feared that the renewed feeling of confidence in Belgian markets may soon be offset by the efforts of Germany to extend her trade. The situation in the iron and steel markets is decidedly better, some rolling mills having completely refilled their books and in some cases promising only six to eight weeks delivery. Among recent orders of size that have been booked, besides the 7400 tons of rails for Denmark, mentioned in THE IRON AGE, May 19, there was one totaling 11,000 tons of rails to the Vicinaux railroads and 5000 tons of rails for export to England. This latter was booked at more than 300 fr. per ton ($25.11) under the British quotation. Although there is a marked improvement in some lines, other lines have been in some instances slightly reduced, leaving the situation about the same. The general dullness of the British market has reduced exports of Belgian as well as other foreign iron and the unstable and dull market there has forced British producers to reduce prices, which has in turn affected Belgian quotations.

Nail and Wire Markets Active

In the nail trade the general improvement is pronounced, with prices showing a tendency to rise. The same condition prevails in the wire trades. Purchases of wire fencing have increased, particularly from the agricultural districts of Flanders and elsewhere in Belgium, usually the best quality and finest material being specified. Inquiries are also appearing for fence pickets and there are several large wire fencing inquiries in the market from South Africa, particularly Rhodesia.

Iron and steel bars have finally ceased to drop and several mills during the past week have quoted a price of 46 fr. per 100 kilos, base, (1.75c. per lb.) which seems to represent the market. The recent rise in value of the franc is not calculated by Belgian sellers to increase foreign buying, either by the United States or Great Britain and the increase of coal prices is considered by consumers to have gone so far that, if Belgium is to compete with foreign producers there must be a reduction in fuel prices. In line with a possible reduction, it is announced that the Belgian coal administration will relinquish part of its control on July 1, with the exception of its supervision of German indemnity fuel.

Antwerp Harbor Improvement Announced

The Minister of Public Works has announced that the project for improvement of the harbor of Antwerp will total about 500,000,000 fr. ($41,850,000). There will be about 2000 meters (6,560 ft.) of piers constructed in deep water and a tunnel under the Escaut. French bidders will be admitted. The question of admitting foreign bidders on public works contracts is providing much discussion. When foreign bidders are mentioned Germany is generally implied.

Canceled Export Material Heavy

Belgium is now approaching about 40 per cent of the pre-war production of iron. In semi-finished material the figures are about 49.5 per cent and in finished material about 55 per cent. It is sometimes pointed out that Belgium is in a somewhat similar position to that of Germany from the standpoint of exchange. Both German and Belgian sellers will feel keenly the gradual rise of exchange rates, which is inevitable.

Investors, special agents and buyers are again appearing in Brussels in numbers, most of them chiefly interested in exporting. This class is evincing considerable interest in some of the export tonnages cancelled and now held by the exporters, who are anxious to dispose of it. These buyers, however, are only attracted by exceedingly low quotations. Although Belgian exporters as a rule suffered but little in the Orient and South American markets by cancellations, at Varna and Roustchouck, Bulgaria, there is more than 80,000,000 fr. ($6,700,000) worth of material repudiated.

Mechanical Engineers

(*Continued from page* 1402)

up by Mr. Smith, Mr. Cardullo asserted that the trouble lay in the fact that oiling has not been functionalized like other operations in a specialized shop. He stated that if a responsible employee were deputized to keep tools properly oiled there would be little further trouble along this line. Much of the present difficulty is due not alone to the failure to oil but to the use of oil of improper viscosity. He stated that machine tool designers cannot build machine tools with a tight housing so that they may be flushed with oil like an automobile, but that certain parts by the very nature of things must be left exposed.

Painting of Machine Tools

Mr. Hoagland brought up the matter of painting machine tools, stating that in the textile industry all machines are painted green, probably because that color is restful for the eye. Mr. Smith thought that gray would be the best color for machine tools, as it is an excellent reflector of light and would be kept clean. He stated, however, that unless machine tool builders adopted a uniform color other than the black now in use, the effect would be anything but desirable in a large shop. In a small shop, of course, all of the machines could be repainted to one color by the buyer.

Mr. Cardullo did not take kindly to the suggestion that an excess of weight in the machine tool is a desirable feature. He stated that each machine is in itself an engineering study and that only enough pig iron should be used for the castings to give the machine durability and sufficient rigidity to withstand vibration from unbalanced work.

Henry J. Eberhart, secretary Newark Gear Cutting Machine Co., Newark, N. J., read a paper on the influence of the automobile on gear cutting and gear cutting machinery. In it he traced the history of the development of gear cutting and pointed out how remarkably accurate were the forecasts of pioneers in this work. In commenting on the paper Mr. Cardullo stated that although theoretically gears of 20 deg. angle and over should operate as quietly as gears of 15 deg. angle and less, that was actually not the case.

A paper on the relation of power press and dies in the automobile industry was presented by Neal W. Dorman, machine designer, Toledo Machine & Tool Co., in the absence of the author, Henry J. Hinde, president and general manager of the company. Erwin E. Wood, sales manager Jones & Lamson Machine Co., Springfield, Vt., read a paper on the influence of the automobile on lathe practice in the absence of the author, Ralph E. Flanders, manager of that company. In speaking informally on the subject of his paper on the fundamentals of interchangeable manufacture, Chester B. Lord stated that engineers often fixed small tolerances when actual practice did not demand it and that greater accuracy was possible when operations were simplified and the tolerances were small than when wider tolerances were provided for and a multiplicity of operations was attempted on one machine. Sub-division of work, he asserted, is a function of accuracy.

Committee on Machine-Tool Standardization

Following the reading of a letter from Mr. DuBrul, manager of the National Machine Tool Builders' Association, asking for the standardization of the commoner machine-tool parts as well as the placing of a limit on the number of sizes of different types of tool, a motion was passed asking that the secretary recommend to the council that a committee on standardization of machine tools be appointed. In his letter Mr. DuBrul pointed out that there are 72 different sizes of upright drills, of which 28 are made by one manufacturer whereas he proposes 8 different sizes to meet the demands of the users. In the discussion it was brought out by various members that lathe spindle tapers and lathe spindle noses were among those things which might well be standardized.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 70c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, $1; pipe, not over 8 in. in diameter, 85c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.20c.

Wire Products

Wire nails, $3 to $3.25 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 and shorter than 1 in., $2; bright Bessemer and basic wire, $3.00 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.00; galvanized wire, $3.70; galvanized barbed wire, $4.10; galvanized fence staples, $4.10; painted barbed wire, $3.40; polished fence staples, $3.40; cement-coated nails, per count keg, $2.85; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days. net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60½ to 63 per cent off list for carload lots, 59½ to 62 per cent for 1000-rod lots, and 58½ to 61 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$3.25
Large boiler rivets.....3.35
Small rivets .....60, 10 and 10 per cent off list
Small machine bolts, rolled threads, 60, 10 and 10 per cent off list
Same sizes in cut threads.....60 and 10 per cent off list
Longer and larger sizes of machine bolts..60 per cent off list
Carriage bolts, ⅝-in. x 6-in.:
Smaller and shorter, rolled threads..60 and 5 per cent off list
Cut threads .....50, 10 and 5 per cent off list
Longer and larger sizes.....50 and 10 per cent off list
Lag bolts .....65 per cent off list
Plow bolts Nos. 1, 2 and 3 head....50, 10 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅝-in. x 4-in.:
Smaller and shorter.....50, 10 and 5 per cent off list
Longer and larger sizes.....50 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.00 off list
Hot pressed nuts, tapped.....$3.50 off list
C. p. c. and t. sq. or hex. nuts, blank.....$4.00 off list
C. p. c. and t. sq. or hex. nuts, tapped.....$3.50 off list
Semi-finished hex. nuts:
½ to 9/16 in. inclusive U. S. S....80 and 10 per cent off list
Same sizes S. A. E.....80, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....4.35c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size, or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $48; chain rods, $48; screw stock rods, $53; rivet and bolt rods and other rods of that character, $48; high carbon rods, $58 to $73, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3.25 to $3.40 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in., and 7/16-in., $3.40 base; 5/16-in., $3.40 base. Boat and barge spikes, $3.40 to $3.65 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4.35 to $4.50 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $12.30 per package; 8-lb. coating, I. C., $12.60; 12-lb. coating, I. C., $14.30; 15-lb. coating, I. C., $15.30; 20-lb. coating, I. C., $16.55; 25-lb. coating, I. C., $17.80; 30-lb. coating, I. C., $18.80; 35-lb. coating, I. C., $19.80; 40-lb. coating, I. C., $20.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.10c. from mill. Refined bar iron, 2.75c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+2½	+28½
¼ to ⅝	52½	26	½	27½	9½
½	56½	42	¾	33½	18½
¾	60½	48	1 to 1½	35½	20½
1 to 3	62½	50			

Lap Weld

2	54½	42	2	30½	16½
2½ to 6	58½	46	2½ to 6	33½	20½
7 to 12	54½	41	7 to 12	29½	16½
13 to 14	45	..			
15	42½	..			

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+10½	+43½
¼ to ⅝	48½	31	½	26½	14½
½	53½	42	¾	33½	19½
¾	58½	47	1 to 1½	35½	21½
1 to 1½	60½	49			
2 to 3	61½	50			

Lap Weld, extra strong, plain ends

2	52½	41	2	31½	18½
2½ to 4	56½	45	2½ to 4	34½	22½
4½ to 6	55½	44	4½ to 6	33½	21½
7 to 8	50½	37	7 to 8	24½	12½
9 to 12	45½	32	9 to 12	19½	7½

To the large jobbing trade an additional 1, 5 and 2½ per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel

1¾ in.	19½
2 to 2¼ in.	30
2½ to 3 in.	41
3¼ to 13 in.	47

Charcoal Iron

1½ in.	+10
1¾ in.	List
2 to 2¼ in.	—10
2½ to 2¾	—15
3 to 3¼ in.	—16
3½ to 4½ in.	—20

Carload Discounts on Standard Commercial Seamless—Cold Drawn

1 in.	56	2 to 2½ in.	17½
1¼ in.	49	2¾ and 4 in.	20
1½ in.	48	4½ to 5 in.	7½
1¾ in.	25		

Hot Rolled

3 to 4 in. 30

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	3.00	Nos. 11 and 12	3.15
Nos. 9 and 10 (base)	3.10	Nos. 13 and 14	3.20
		Nos. 15 and 16	3.30

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.80	No. 28 (base)	4.00
Nos. 22 to 24	3.85	No. 29	4.10
Nos. 25 and 26	3.90	No. 30	4.20
No. 27	3.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	4.00	Nos. 25 and 26	4.70
Nos. 12 to 14	4.10	No. 27	4.85
Nos. 15 and 16	4.25	No. 28 (base)	5.00
Nos. 17 to 21	4.40	No. 29	5.25
Nos. 22 to 24	4.55	No. 30	5.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.80	No. 28 (base)	4.00
Nos. 17 to 21	3.85	No. 29	4.05
Nos. 22 to 24	3.90	No. 30	4.05
Nos. 25 to 27	3.95	Nos. 30½ and 31	4.10

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
May	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
18.....	13.00	12.75	33.00	5.10	4.85	5.35	4.85
19.....	13.00	12.87½	33.00	5.10	4.85	5.30	4.80
20.....	13.00	12.87½	33.25	5.10	4.80	5.30	4.80
21.....	13.25	13.00	....	5.10	4.80	5.30	4.80
23.....	13.25	13.25	32.75	5.10	4.80	5.30	4.80
24.....	13.25	13.25	32.25	5.10	4.80	5.25	4.75

NEW YORK, May 24.

The copper market is the most active and strongest of all with foreign demand predominating. The tin market is quiet with prices steady. Both the lead and zinc markets are quiet with the latter rather weak.

New York

Copper.—Foreign buying of copper continues to be the feature of the market and demand seems to increase rather than otherwise. While it is impossible to state in the aggregate the amount of electrolytic copper sold in the last week for export, it is admitted that the volume is larger than in the previous weeks, with practically all principal countries participating. One seller states that sales to England have been heavy, while another mentions Germany and France as well as Italy and the Far East. Sellers' ideas of prices have consequently advanced to the extent that some are quoting above the market or not quoting at all. A fair appraisal places electrolytic copper at 13.50c., delivered, or 13.25c., New York, for early or June delivery as the minimum, with some sellers unwilling to sell at less than 13.75c. and others asking 14c., delivered, all for domestic consumption. Quotations for export generally range from ⅛c. to ¼c. above these levels. Most sellers refuse to quote for delivery in the third quarter. Export demand is so good that some restrictions are being put upon agents abroad as to the amount they can sell. Lake copper is practically on a par with electrolytic, being quoted at 13.50c., delivered, or 13.25c., New York.

Tin.—The week as a whole has been an exceedingly quiet one. A little business was done last Thursday, May 19, when May-June shipment from the East was sold at 33c., with sales of spot Straits also at the same price, the total purchases amounting to 150 to 200 tons. The only other event of consequence was the slump in exchange yesterday when sterling fell to a low of $3.95 for prompt cables, due largely to the Silesian affair. This resulted in an easier tone of the market here and slightly lower prices. Spot Straits to-day is quoted at 32.25c., New York, and the London market was to-day about £3 per ton lower than yesterday, but about on a level with the quotations a week ago, with spot standard at £181, future standard at £181 10s. and spot Straits at £185. Arrivals thus far this month have been 955 tons, with 2075 tons reported afloat.

Lead.—The market is quiet and dull. Buying has subsided and an easier tendency is in evidence. Prices, however, are fairly firm at 4.80c., St. Louis, or 5.10c., New York, for early delivery in the outside market, with the leading interest still quoting 5c., both New York and St. Louis.

Zinc.—There has been no improvement in demand from consumers or dealers and on the very small volume of business done prices have slightly declined. Prime Western for early delivery is quoted to-day at 4.75c., St. Louis, or 5.25c., New York, with sales confined to a carload or two here and there and with some producers entirely out of the market.

Antimony.—Quotations are unchanged for wholesale lots for early delivery at 5.25c., New York, duty paid.

Aluminum.—The leading producer continues to quote virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery at 28c., f.o.b. plant, while other sellers offer the same grade mostly from foreign sources at 22.50c. to 23c., New York.

Old Metals.—The market continues strong and business is a little more active. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	9.75
Heavy machine composition	12.00
Brass, heavy	8.00
Brass, light	6.00
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	6.00
Lead, heavy	4.50
Lead, tea	3.25
Zinc	3.50

Chicago

MAY 24.—Tin and copper have advanced ½c. each and lead and tin have declined 1/10c. The advance in tin is not due to purchases by consumers, but rather to dealers buying and the fact that the metal is rather closely held. Copper has been strengthened by export sales. At the same time forced liquidation by holders of copper is practically over. There is considerable inquiry for future delivery but producers for the most part are disinclined to quote. However, on September delivery 14c. to 14.25c. has been named. Lead has weakened as a result of the unloading by dealers who bought for speculative purposes during the advance of from 4c. to 5c. Although zinc smelters are down, considerable of this metal continues to be pressed on the market with a depressing effect on prices. Old metal prices are unchanged. We quote Lake copper at 13.50c. in carload lots; tin, 33.50c.; lead, 4.90c.; spelter, 4.90c.; antimony, 7.50c. On old metals we quote copper wires, crucible shapes, 8.25c.; copper clips, 8c.; copper bottoms, 7c.; red brass, 7c.; yellow brass, 5c.; lead pipe, 2.75c.; zinc, 2c.; pewter, No. 1, 17c.; tinfoil, 19c.; block tin, 22c., all these being buying prices for less than carload lots.

St. Louis

MAY 23.—The non-ferrous markets have been quiet with a fairly steady tone with lead in car lots selling at 5c. and spelter at the same figure. In less than car lots the prices have been: Lead, 5.25c.; spelter, 5.50c.; tin, 37c.; copper, 13.75c.; antimony, 7.50c. In the Joplin district ore has been higher, for lead at least, with the prices ranging up to $60 per ton basis 80 per cent at which figure a considerable tonnage was sold. Zinc blende, basis 60 per cent, has been selling at $25 per ton, while calamine is still out of the market because of the unprofitableness in operating. Miscellaneous scrap metals have shown no change in dealers' buying prices since last report and quotations are as follows: Light brass, 4c.; heavy yellow brass, 5c.; heavy red brass, 8c.; heavy copper and copper wire, 9c.; light copper, 7.50c.; zinc, 3c.; lead, 3.50c.; pewter, 15c.; tinfoil, 18c.; tea lead, 2c.; aluminum, 9c.

Ore Rate Hearing Postponed

WASHINGTON, May 24.—The hearing of protests of the Lake Superior Iron Ore Association against freight rates on ore from the mines to Lake Superior docks, which was to begin next Tuesday in Chicago before Examiner Money of the Interstate Commerce Commission, has been indefinitely postponed at the request of the carriers. It is hoped by the shippers that the hearings will begin at an early date. It is understood that at the conference last week in Cleveland between the shippers and representatives of carriers serving the Michigan and Wisconsin mines, the former were willing to agree to withdraw their complaint against the rates existing prior to February of this year applying to all the upper lake mines, including those in Michigan, Wisconsin, and Minnesota, provided the carriers serving the Michigan and Wisconsin mines would withdraw the 15-cent increase which went into effect in February, and against which protest had been made. Both cases have been consolidated and are to be heard together unless the 15c. increase is voluntarily withdrawn without any condition. The shippers consider that the rates prevailing before that advance was made were unjust and propose to combat them as well as the subsequent 15-cent increase from the Michigan and Wisconsin mines.

ANTI-DUMPING CASE

Federal Trade Commission Refuses to Dismiss—Effect of Proposed Bill

WASHINGTON, May 24.—The Federal Trade Commission has temporarily overruled the motion of respondents to dismiss its complaint in the so-called ferromanganese anti-dumping case. As a consequence, the proceedings are to be resumed at some date not yet determined, when the respondents will present their arguments and it is claimed they are considering the plan of taking testimony in England from makers of ferromanganese in that country whose importers in the United States are charged with having sold the alloy in the domestic market at less than the foreign home market value. This, according to the commission, constituted an unfair method of competition. When the arguments are resumed, the commission will again pass on the motion to dismiss, determining whether it feels that it has or has not made a sufficient case against the respondents. It is understood that the commission at present considers that it has developed enough evidence to indicate that it will produce a case against the respondents. It, however, as previously announced, dismissed the complaint against Rogers, Brown & Co., because of lack of evidence.

The case has lost considerable of its interest in view of the passage by Congress of a new anti-dumping bill, which covers the identical point under which the commission is proceeding in the ferromanganese complaint, though it is acting under the Clayton act and not the prevailing anti-dumping law. But the new legislation provides a penalty of an additional customs duty, over the regular duty, where there is one, for the selling of foreign goods in the domestic market at less than the foreign home market value, the penalty to be equal between the latter and the domestic market value.

Apparently, therefore, the ferromanganese proceeding is nothing more than a formal matter now inasmuch as the new law will cover such a situation in the future and it will be under the jurisdiction of the Treasury Department, so that, it seems, the commission no longer will issue complaints of unfair methods of competition where they relate to so-called dumping.

OPERATIONS REDUCED

Ford Motor Co. Does Not, However, Expect to Close Plant Entirely at Early Date

DETROIT, May 23.—The statement that the Ford Motor Co. will shut its plant down completely in the near future met with a denial from plant officials. It was admitted that posters had been put up stating that on account of the uncertainty of the times in the automotive industry it would be advisable for all employees to husband their financial resources. All this means little, however, because it now appears that such a shutdown will be necessary whether the Ford officials wish to admit it just yet or not. Production at the Ford plant one day last week was 4036 cars. This compared with the number of orders announced by the company, and the fact that each summer sees a slowdown, even in normal times, would indicate that probably July and August will see a partial if not a complete shutdown, not only at the Ford plant but in the other automotive plants in the city.

Plant Operations

The Charleroi, Pa., plant of the Electric Alloy Steel Co., Youngstown, Ohio, maker of high speed tool steels and special analysis carbon steels, has been operating to capacity since May 1, with orders on hand sufficient to maintain such schedules for four weeks longer. Both as to tonnage and number of orders placed, the company's business is at a better rate than ever before, states President Louis J. Campbell.

Since the company began operations, each successive month has brought an increased volume of business. Less than 50 per cent of its shipments are to the automobile industry. It is the expectation to maintain a fair rate of operations during the summer months.

At a recent meeting of directors, the old officers were re-elected, including besides Mr. Campbell, vice-president A. E. Adams and secretary and treasurer, W. D. Myres.

The New England railroad shop situation is improving gradually. Half of the Boston & Maine Railroad, Concord, N. H., repair plant is closed this week, but this action is more than offset by the taking on of approximately half the regular forces at the New York, New Haven & Hartford Railroad's East Hartford, New Haven and Readville car repair shops.

The Stevens-Duryea Motor Co., Springfield, Mass., has increased production 50 per cent and should be running full this week. The company recently has secured encouraging orders for automobiles.

The Morgan Construction Co., Worcester, Mass., rolling mills, has sufficient business on its books to keep the plant running at present capacity approximately two years. The plant is operated at 88 hours per week, with two shifts, each of 44 hours, is employing 820 men and is 50 per cent busier than it was a year ago. Australian, Indian, French and English interests recently placed business with the company.

Employee Representation Planned by Swift & Co.

An employees representation plan has been put into operation in 17 plants of Swift & Co., packers, following its successful running for some time in three of them. The plan provides for an assembly composed of equal numbers of elected representatives of the employees and appointed representatives of the management, acting in detail through committees of the assembly. The assembly will discuss and make recommendations on all questions referred to it or raised by it, relating to the joint interests of the company and its employees and to working conditions in particular, such as wages, hours, safety, sanitation and like matters. When any decision of the Assembly of Joint Representatives is reached by a two-thirds vote it will be sent to the management for action and will have binding effect upon both employer and employees, unless within fourteen days the board of directors of the company or the employees' representatives request the Assembly to reopen the matter for further consideration.

The principles which have been adopted, according to John Calder, manager of industrial relations of the company, are as follows:

Compulsory submission of all differences, individual or group, in the first instance to the foreman concerned.

Compulsory submission of any grievance or disagreement to the employee and employer representative for the voting division of the plant in which the party or parties are employed.

Unanimity in every committee is essential to a binding decision.

Compulsory submission to the assembly of all joint issues not settled in committees.

Right of any minority of the assembly to have one reconsideration of a decision but no further delay except by general consent.

No provision for arbitration in the plan but no specific exclusion of it as a possible means of settlement outside of the plan.

No direct veto of an assembly decision by management or employees without recourse to joint conference for reconsideration.

Clear and specific indication in the plan of the consequences of ultimate failure to agree under the plan and of the right of parties to seek relief in such circumstances by independent action.

No provision for terminating the plan because of failure to arrive at a collective agreement on any one issue before the assembly.

The strike of molders in Chicago jobbing foundries called on May 5 is still in force. Two of the 40 odd union shops affected, the James A. Brady Foundry Co. and the Greenlee Foundry Co., have resumed operations on an open shop basis.

PERSONAL

William Anglin resigned recently as superintendent of the bar mills of the Pittsburgh Crucible Steel Co., Midland, Pa.

Thomas G. Watson has been elected treasurer and manager of John J. Kelleher, Inc., dealer in iron and steel scrap. He will be located at the Brooklyn yard, Fifteenth Street and Hamilton Avenue.

D. S. Tucker, for the past ten years Cleveland district sales manager of the Elliott Co., Pittsburgh, and George Day, formerly sales manager of the M. Beatty & Sons Co., Welland, Ont., have formed the Tucker-Day Machinery & Supply Co., with headquarters at 619 National Building, Cleveland, specializing in drop forgings, power plant and general contractors equipment.

George S. Vail has been selected by the board of directors of Arthur G. McKee & Co., Cleveland, for the newly created position of general manager. Mr. Vail joins the board which has been increased to five members.

Oscar E. Harder, University of Minnesota, was elected chairman of the Steel Treaters' Section of the Manufacturers' Club of Minneapolis at the second annual meeting in the Builders Exchange of that city on May 10. H. K. Briggs, Minneapolis Electric Steel Casting Co., was named vice-chairman, and Alexis Caswell, secretary of the Manufacturers' Club, was chosen secretary-treasurer.

George C. Thayer, former general manager of the Harriman plant of the Merchant Shipbuilding Corporation, Bristol, Pa., has been appointed assistant to the vice-president, with office at Chester, Pa. L. D. Keller has been appointed executive assistant to the vice-president.

George W. Mixter, connected with G. W. Goethals & Co., Inc., New York, has been appointed president of the Pierce-Arrow Motor Car Co., Buffalo, N. Y.

M. J. Lahey, sales manager Chevrolet Motor Co., Detroit, a General Motors subsidiary, has resigned to become sales manager of the Durant Motors Corporation, New York.

N. W. Kistler has resigned from the safety department of the Youngstown Sheet & Tube Co., Youngstown, Ohio, to become safety inspector of the Whitaker-Glessner Steel Co., Portsmouth, Ohio. In his new capacity he will have charge of the fire, police, welfare, employment, sanitation and hygiene and safety departments.

Prof. A. E. White, University of Michigan, president of the American Society for Steel Treating, addressed the Detroit chapter of that society last Saturday. The chapter presented an honorary membership to Prof. E. D. Campbell, University of Michigan.

Henry T. Gerdes, mechanical engineer and manufacturer, New York, has been elected president of the Hauck Mfg. Co., Brooklyn, N. Y., manufacturer of oil burners, oil forges, oil burning appliances, etc. Other officers are: first vice-president, M. C. Hauck; second vice-president, A. B. Hauck; third vice-president, H. H. Kress; treasurer, A. H. Stein; secretary, J. Lutz. Mr. Gerdes, who succeeds the late Arthur E. Hauck, is a graduate of Stevens Institute of Technology and was for many years manager of the Treadwell Engineering Co., Easton, Pa. He has a practical knowledge of the manufacture of oil burning torches and appliances.

B. Fortuin, former secretary and treasurer of the Duke Steel Co., 191 Pearl Street, New York, is now president and treasurer, succeeding W. B. Dukeshire, who is no longer with the company.

Robert W. Romig, who for a number of years was foreman of the mechanical service department, later salesman, and for the past ten years manager of the scale department of the Pittsburgh branch of the Fairbanks Co., has severed his connections with this firm and is now an associate member of the Pittsburgh branch of the Strait Scale Co.

Lawrence J. La Cava is now with the Max Ams Machine Co., New York, and will have charge of sales for the Eastern territory.

George M. Verity, president American Rolling Mill Co., Middletown, Ohio, addressed the Cleveland Chamber of Commerce May 24 on "Community Leadership and Co-operation," illustrated with motion pictures.

Henry C. Knox, formerly treasurer American Brake Shoe & Foundry Co., has become a special partner in the firm of Brumley, Chamberlain & Co., members of the New York Stock Exchange.

Glenn Muffly, general sales manager Lees-Bradner Co., has resigned to assume similar duties with the Miller Shock Equalizer Co., Cleveland.

Ralph S. Cooper, vice-president and general sales manager Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, who has just returned after eight months in Europe, establishing branch offices and agencies for the company, has been appointed general manager in addition to his other duties.

Col. William C. Skinner, president Colt Patent Firearms Mfg. Co., Hartford, Conn., has been made chairman of the board. Samuel C. Stone, vice-president, succeeds Colonel Skinner as president.

Edward R. Knowles, C. E. E. E., consulting engineer and fuel expert, is now associated with Murrie & Co., Inc., engineer, 74 Broadway, New York, in charge of pulverized coal and gas fuel engineering work.

W. S. Pilling of Philadelphia was struck by an automobile one day last week, suffering an injury to the knee, which will confine him to his home for a few weeks.

Lewis R. Smith, New York manager Matthew-Addy Co. and president Colliers & Commerce Corporation, arrived Saturday on the Aquitania after a several weeks' business tour of Europe.

Illinois Central Railroad Inquires for Machine Tools

CHICAGO, May 24.—The Illinois Central Railroad has issued inquiries for a 90-in. driving wheel lathe, a 48-in. by 48-in. by 30-foot planer, two 24-in. by 14-foot engine lathes, one 20-in. by 12-foot lathe, one 18-in. by 10-ft. lathe, one 28-in. shaper, one 24-in. shaper, one 20-in. shaper, one universal grinder, six 18-in. wheel electric double grinders and two bolt cutters, all motor driven. Further inquiries by this railroad will follow.

Cincinnati Steel Treaters Meet

The annual meeting of the Cincinnati Chapter of the American Society for Steel Treating was held at the Ohio Mechanics Institute on May 20. The principal business was the balloting for officers for the coming year. This resulted in the following being named: Chairman, R. M. Taylor, works engineer American Tool Works Co.; vice chairman, A. L. Meyers, superintendent R. K. LeBlond Machine Tool Co.; secretary-treasurer, Fred L. Martin; executive committee, Wm. Cowell, assistant works manager Lodge & Shipley Machine Tool Co.; J. Hunter Nead, metallurgist American Rolling Mill Co.; W. R. Fleming, metallurgist Andrews Steel Co.; E. S. Sawtelle, assistant superintendent, Tool Steel Gear & Pinion Co., and George Langen, Jr., Advance Tool Co. C. P. Richter, Central Steel Co., Massillon, Ohio, read a paper on "Alloy Steel and Common Sense" in which he described the latest developments in the use of alloy steels for gear manufacturing and other purposes.

OBITUARY

DR. EDWARD BENNETT ROSA, chief physicist since 1901 of the Bureau of Standards and a member of a number of prominent scientific and engineering societies, died suddenly May 17, at the age of fifty-nine. He was known in the iron and steel trade for his achievements in scientific research and also for the keen interest he showed in the prevention of industrial accidents. Dr. Rosa received the Elliott Crosson medal of the Franklin Institute. He was a fellow of the American Institute of Electrical Engineers, the American Physical Society, the American Association for the Advancement of Science, and a member of the National Academy of Science, the Illuminating Engineering Society, Washington Academy of Science and the Philosophical Society. Dr. Rosa was a graduate of Wesleyan University, and received the degree of doctor of philosophy from Johns Hopkins in 1891, and of doctor of science from Wesleyan in 1906. During the war, Dr. Rosa directed the development of scientific instruments of inestimable value to the American forces in France. Among these were a sound ranging device for locating big guns; the geophone for the detection of mining operations; the development of aircraft radio apparatus, and the improvement of radio direction finders by which enemy ships and aircraft could be located.

ADOLPH SORGE, JR., well known in engineering circles in Chicago, died May 5. He was a graduate of the Stevens Institute of Technology, Hoboken, N. J., class of 1875. He went with the E. W. Bliss Co., Brooklyn, and had charge of its exhibit at the Centennial Exposition at Philadelphia in 1876. About 1893 he became general manager of the Wood-Mosaic Co., Rochester, N. Y. From Rochester Mr. Sorge went to Chicago, becoming superintendent of the foundries of the Fraser-Chalmers Co., building mining machinery and steam engines. In 1895 he resigned to become the general Western representative of the Harrison Safety Boiler Works, Philadelphia, subsequently incorporated as the H. S. B. W.-Cochrane Corporation, and established branch offices in St. Louis, Detroit, Indianapolis, Cincinnati, Minneapolis and Omaha. He was the first to see the advantages of heat in the chemical treatment of water for the removal of hardness, and the present Sorge-Cochrane hot process water softener is a further development of ideas originally patented by him. He was one of the originators and founders of the Technical Club of Chicago and was also a member of the Engineers' Clubs of Chicago and New York, as well as of the American Society of Mechanical Engineers.

CHARLES MAPLES JARVIS, for some years president of the American Hardware Corporation, New Britain, Conn., and before that for 22 years prominently identified with fabricated steel work, died at Atlantic City, N. J., on May 21, after an illness of two years. He was born on April 16, 1856, at Deposit, Delaware County, N. Y., and was graduated from the Sheffield Scientific School of Yale University in 1877 in the course of civil engineering. In the spring of the following year he entered the employ of the Berlin Iron Bridge Co., East Berlin, Conn., then known as the Corrugated Metal Co., as engineer and draftsman. In a few years he had become president and chief engineer of the company and on the absorption of this company by the American Bridge Co., became a director of the latter, as a vice-president and member of the executive committee. He was a leading spirit in the organization of the American Bridge Co. in May, 1900, and was in charge of shop operations. He retired when the company became a subsidiary of the United States Steel Corporation. He served as one of the vice-presidents of the American Society of Mechanical Engineers from 1897 to 1899.

JOSEPH WEIXEL, who had charge of the puddling department of the Pittsburgh Forge & Iron Co. for a number of years in the early '80's, died at the home of his son, 1413 Cooper Avenue, Pittsburgh, N. S., May 19. He was born in Bavaria, Germany, Jan. 12, 1826, coming to this country with his parents in 1836. He learned puddling at the old Sligo rolling mill, owned by Phillips-Nimick & Co. From 1871 until 1878 he had charge of the puddling mill of the Pittsburgh Bolt Co.

GEORGE J. FORAN, manager condenser department, Worthington Pump & Machinery Corporation and the associated companies of the International Steam Pump Co., died May 12 at his home in New York. He was born in Boston Jan. 22, 1862, and was graduated from the Massachusetts Institute of Technology in 1883, in which year he entered the works of the Deane Steam Pump Co., remaining until 1886. Then he became associated with the George F. Blake Mfg. Co., where he specialized in engineering design and construction of water works, condensing and air compressor installations and tests and investigations in New England. When the International Steam Pump Co. was formed in 1901 he went to New York to accept the position which he filled until his death. During the war he served upon the committees on condensing apparatus of the United States Shipping Board and War Industries Board and as chairman of the American Engineering Service of the Engineering Council, which handled all questions of personnel between the various Governmental departments and the four national engineering societies. He was a leader in the development of high vacuum apparatus. He belonged to the American Society of Mechanical Engineers, the American Association for the Advancement of Science, the Engineers' Clubs of New York and Boston and the American Society of Naval Engineers.

HENRY SEELEY WILLARD, president Milton Iron Co., Wellston, Ohio, died suddenly at his home there on May 11. Mr. Willard was born in Cincinnati Aug. 31, 1849. He built the Milton Iron Furnace at Wellston 48 years ago in conjunction with Alanson Robbins and operated it until 1885, when he sold it to F. E. Hinkley. The furnace later became the property of the late H. A. Marting and associates. Subsequently, in partnership with J. C. Clutts, Mr. Willard was interested in the operation of both the Milton and Wellston furnaces. After the retirement of Mr. Clutts, Mr. Willard was associated with the late Eugene Zimmerman and the late M. L. Sternberger. On the death of the latter, the company was reorganized, Mr. Sternberger's heirs taking over the Wellston furnace while Mr. Willard retained the Milton stack. Mr. Willard was also heavily interested in coal properties, organizing in 1892 the Superior Coal Co., one of the largest operations in the Jackson field. He was president of the First National Bank and a prominent member of the Masons and Elks and also took a very active interest in civic affairs. He was a graduate of Yale University and the Massachusetts Institute of Technology.

GEORGE VINCENT ROGERS, Boston, owner of the Holmes & Blanchard Co., crushing and grinding machinery, and one of the most widely known machinery and fire insurance adjusters in the United States, died suddenly May 17 at Waterford, Conn., where he was building a country estate. Mr. Rogers was born in Hopkinton, R. I., 59 years ago.

F. WILLIAM GARTMAN, former vice-president, York Electric & Machine Co., York, Pa., died on May 3.

EBEN JONES, president Globe Iron Co., Jackson, Ohio, died suddenly in New York on May 12. Mr. Jones was one of the first to embark in the iron industry in Jackson County.

WILLIAM GILMOR HOFFMAN, JR., 59 years old, for years vice-president of the T. H. Symington Co., and more recently a member of the firm of Symington, Hoffman & Co., consulting engineers, died May 21 at a Baltimore hospital, following an operation.

National Safety Council holds a joint spring meeting May 31 with the Cleveland Engineering Society at Hotel Statler, Cleveland. Papers will be presented on Teaching Safety; Mechanical Refrigeration Code; Protection of Mixing Rolls such as those used in the rubber industry; Safety Standards for French Construction; Need of Industrial Revision and the Engineer's Part.

Taylor Society Meets at Cleveland

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more violent than our over-production last year, which indicates that the present under-production will not last long and that there will be a violent reaction. In his opinion we ought to be able to stabilize production, industry, employment and prices so that violent changes in business conditions can be avoided. He believed that production data can be developed to a point where it will not be hard to make forecasts, and that within another year fairly accurate forecasts can be prepared.

Correct Methods of Gaging Future Demand Required

According to the speaker, the problem of over-production of a particular commodity is really only one of unbalanced general production. Could we get a balance of the production of commodities corresponding to the balance of the demand, there would be no over-production of a particular commodity, and every plant could run continuously and maintain continuous employment. This requires elaborate statistics concerning production.

Efforts of managers to gage industrial conditions and tendencies and to plan accordingly is largely a matter of guess. While in the general price level the producer has as a rule a means of gaging fairly well what should be the general run of his costs and prices, that general index does not throw much light on the price of a particular commodity. With all the influencing factors known, the relative price of almost any article of commerce may be calculated with reasonable accuracy. Relative values of leading raw materials are pretty well known and there is no reason why this should not be equally true of secondary products. No method which will contribute to this end should be neglected. One of the foremost of these is a production barometer. If we could watch carefully the rate of production in all lines, we need not have what is commonly called over-production, but what really is production out of balance.

Leonard Ayres also spoke of the need of having indices of production as a means of preventing periods of over-production, and added that social unrest could be reduced by avoiding periods of under-production and violent price fluctuations.

Over-Duplication of Manufacturing Facilities

E. W. Hulet said that the White Company had used indices of production for several years, but lately had to change its ideas on the subject and turn its attention to the subject of consumption. By doing this it had been able to increase its business over that of its competitors, but not enough to keep its factory running.

In his opinion the turning point in the management of business has been reached. Business must now be planned ahead for five years to take care of expansion, but who can figure that far ahead? The chances of success in business at present, with panics every seven years, is not equal to that of a well-run gambling room. His company had been built up five times in twenty-three years, only to go back. In this country there are 220 truck manufacturers and room for only 10. European manufacturers are now putting trucks into the United States $500 cheaper than they can be built here. All the brains of America must be called on to solve the problem of successful management.

Dr. Frank B. Gilbreth, consulting engineer, Montclair, N. J., in discussing the subject of indices of production, said other speakers had not mentioned the elimination of waste in industry, which was a very important subject and should be given proper attention. He stated that European students are so far ahead of us in these subjects that our own work in that direction looks ridiculous, and that Germany will shortly bring out standards of elimination of waste in industry that will make Americans wake up.

Time Factor Influences Production

Morris L. Cooke, Philadelphia, addressed a joint meeting of the Cleveland Engineering Society and Electrical League Friday noon, members of the Taylor Society being guests at this luncheon meeting. Mr. Cooke took for his subject "Why the Man of Big Administrative Affairs Should Interest Himself in Scientific Management." He touched on some of the high spots of scientific management and said that the best definition of it that he had heard was that it was organized common sense.

He stated that since the war a new factor has been introduced in scientific management. Formerly it was assumed that we could drift along to results. Now manufacturers and society are confronted by a new factor—a time factor. Scientific management cannot be adopted arbitrarily. The co-operation of everyone in a plant must be secured before a start is made. A favorable environment must be created instead of forcing a plant to accept the plan. There should be standardization of equipment, process and product.

He said that it was pitiful to see what small steps had been taken in some lines toward scientific management. He regretted that progress made during the war in standardizing product and eliminating patterns had not been kept up, but expected great progress would be made in all three directions. An important thing in standardization is to functionalize foremanship. If a company accomplished nothing but that, in three years, it would be doing much. He also laid emphasis on cost accounting—not as a matter of record, but to help in lowering unit costs.

Mr. Cooke urged the adoption of adjustable wage systems, saying that this is a good time to take up this matter. He warned against starting time studies with a stop watch, saying there are a thousand and one other things to be taken up first, and that if a concern started its standardization work with time studies and a stop watch it would not meet the success it should. The speaker stated that a remarkable change is coming over labor's attitude in reference to production, and that intelligent leaders of labor now understand that they have got to get behind the problem of increased production. Concerns that do not take up scientific management methods within a reasonable time are going to feel the competition of those that do, and will meet competition they cannot stand. However, not only is competition involved, but the vital principles of life.

Government Aid for Zinc Industry

WASHINGTON, May 24.—A survey of conditions in the zinc industry in foreign countries has been completed by the Department of Commerce following conferences with domestic producers who have pointed out the depression in this country and the possibility of more vigorous foreign competition as the result of development of the industry in France and England. This situation, domestic producers maintain—and they are supported by Secretary Hoover in their claim—requires aid from the Government in developing markets and in giving tariff protection. The survey shows the aid given by the British Government to maintain operation of Australian mines and the impossibility of private smelters paying the British Government's purchase price of concentrates.

Indeed private smelters can not with present costs and prices pay the British Government's purchase figure. It is estimated that English smelters can not work the Government contract on spelter prices at less than £38 per ton, while Continental smelters can not work this concentrate under £25 to £28 spelter per ton. Therefore, business in resale of these concentrates has practically ceased. But little other concentrates are being shipped outside this contract, for with high mine costs the concentrates can not be produced for much less than the British Government purchase formula.

The Buffalo Forge Co., Buffalo, N. Y., is remodeling its fan shop. It will cover 64,235 sq. ft., including 23,873 sq. ft. of assembling galleries. The reconstruction work is being carried on without interfering with the regular fan construction. Material racks are already in place along one fire wall and the machine equipment has been laid out so that all fan construction will proceed with a minimum of handling. The material racks are served by an electric railroad truck with an automatic lift platform that permits sheets to be slid directly from the racks to the car and then run to a position for the first machining operation.

Supply Men Expect Trade Recovery in Fall

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are coming thick and fast for a national policy which will make the paths of trade clear and straight."

"Disturber of Commercial Peace"

There are many business men, Mr. Williams said, who are praying for the demise of the Federal Trade Commission, which he characterized as a "disturber of commercial peace."

In concluding his report Mr. Williams said:

"One of the fundamentals that should engage the attention of every business man in this country, as a corrective of many of the abuses which now exist, is religion and the principles it inculcates. The world is sick, sick at heart, sick in mind, and almost on the verge of despair. The reflex influence of the present unhappy mental processes of the peoples of foreign countries is being felt in our own. Disregard for obligations which every man must feel in his heart towards the Divinity who presides over our destinies has brought about a condition which calls for an about-face, and a return to the principles and practices in human living such as characterized the homes from which you sprang. Public men everywhere heretofore silent upon this topic are beginning more and more to press it upon the attention of business men. They now agree that law makes no man nor people good. Law is simply a rule of action and its penalty a deterrent. Coupled with law must be the spiritual recognition of Him who rules best when He rules through the hearts of men."

Problems discussed in the report of the sales correction committee, A. B. Peck, American Screw Co., Providence, R. I., chairman, included the restoration, as suggested by jobbers, of the 2 per cent cash premium, which was reduced to 1 per cent by some manufacturers as a war-time measure and the stabilization of list prices. It was claimed that the withdrawal of the 2 per cent cash discount takes away from many jobbers their net profit on certain items. There was complaint that list prices are changed too frequently, thereby causing confusion. Complaint was made by the committee that some jobbers refuse to pay for goods until they are received, "when they well know or should know that after goods are delivered into the hands of the carrier, the responsibility of the shipper ceases." It was also reported that the jobbers want to be placed in a position to sell large consumers at prices equally as low as those quoted by the manufacturers direct. On this point the committee's report said: "Possibly if the dealers didn't let many of their experienced buyers drift to the employ of the large consumers referred to, it might help them considerably in solving this problem among themselves."

The Monday morning session closed with an address by Magnus W. Alexander of the National Industrial Conference Board. Mr. Alexander illustrated his talk with charts which showed the present trend of the cost of living, compared with wage scales.

Conditions in the South Fundamentally Sound

THREE addresses were delivered at the triple joint session on Monday afternoon. The first speaker, W. P. Simpson, C. T. Patterson Co., New Orleans, La., discussed business conditions in the South. He said that the products of the South, being largely from the soil, that section has naturally been seriously affected by the lower prices for agricultural products, but he added that the fundamental condition of the South is absolutely sound, and, due to its widely diversified resources, its recovery from the present depression will probably be more rapid than that of any other section of the United States.

Mr. Simpson endeavored to correct the impression that the South is absolutely dependent on the cotton situation. He emphasized the importance of the production of iron, steel and coal, oil, lumber, sulphur, rock salt, rice and sugar. He said the Louisiana oil producing section is one of the greatest in the world, that Southern lumber will average about 40 per cent of the entire quantity produced in the United States and that the Gulf Coast of Louisiana and Texas produces about 70 per cent of the world's supply of sulphur.

Great Future for New Orleans

In considering the agricultural production of the South, Mr. Simpson pointed out that the vast development that has taken place in industrial and manufacturing lines should not be overlooked. He referred to the recent organization of the Federal International Banking Co., with headquarters at New Orleans, as an indication of the financial resources of the South. This company raised seven million dollars capital for the purpose of financing exports and will play a considerable part in the financial machinery necessary to handle the export business of the Southern States. The speaker said that the United States must find an outlet for much of its surplus products in the Latin American countries and in this connection he predicted a great future for New Orleans as an export shipping point; this because of its location at the southern end of the Mississippi Valley, which produces in twenty-seven states, 86.9 per cent of the corn, 80.8 per cent of the wheat, 74.8 per cent of the livestock, 95.8 per cent of the coal, 92.6 per cent of the coke, 97 per cent of the iron ore and 91.7 per cent of the pig iron. These percentages in the main, he said, hold good throughout the list of food and raw material products.

Melville W. Mix, president Dodge Mfg. Co., Mishawaka, Ind., in discussing present business conditions, said that there has never been a time in the business history of the country when a change such as has been experienced recently in business has been met with such complacency. He added: "My judgment is that business is going to improve; it is going to be better just as soon as those items which have not yet been liquidated are placed on the right level. Particularly does this affect the retail trade and the wage situation, which would include, of course, transportation. The wholesale market has been deflated but retail prices have not been deflated. While retail associations and various merchants will tell you how they have marked down their goods, if you will go and look over the stock you will confirm my opinion that these reductions have been made on a lot of things which they would like to get rid of, which you don't want, and on a lot of things that are not essential.

"The laboring man is going to object, of course, to a reduction in his wage. As he goes downtown to spend his money he finds that he has to pay as much now for a pair of shoes or a hat or a suit of clothes as he did a year before. He does not buy it. The merchants have not met that condition. I don't know when they are going to do it but it is going to be necessary for every person to do what he can to bring about a readjustment."

Mr. Mix said that we will not get anywhere in the business readjustment until wages and prices have reached a proper level and he predicted that it may take the rest of this year to bring about this condition.

Motor Trucks Number 975,000.

In an address on motor truck transportation, S. N. Thompson, the White Co., Cleveland, said that there are approximately 975,000 motor trucks in the United States, representing an investment of nearly $2,000,000,000. These trucks, he said, operating at an average of 25 miles per day, have a potential carrying capacity of ten billion ton-miles a year. At the indicated rate of production there should be in ten years 5,000,000 motor trucks in operation with a potential carrying capacity of 53,000,000,000 ton-miles.

Mr. Thompson referred to the mortality rate in the truck manufacturing business. Of these 698 motor truck manufacturers which have started in business only 259 or 37.1 per cent were listed as being in business in 1920. Most of those which discontinued business lacked sufficient capital, others lacked sufficient output for economi-

cal manufacture, while still others failed because of lack of experience.

25% Loss on Inventories.

At the Tuesday morning session, the manufacturers listened to a talk by J. L. Pitts, Brown-Roberts Hardware & Supply Co., Alexandria, La., who discussed the present situation in the supply business of the South. Mr. Pitts said that the combined capital stock of the members of the Southern Supply and Machinery Dealers' Association is $40,000,000; the combined inventory on December 31, last, was $60,000,000. There has been a markdown of this inventory of approximately $15,000,000, or 25 per cent. Mr. Pitts said that jobbers are gradually liquidating their stocks, but of some items they have a sufficient supply apparently to last most, if not all, of this year.

If there is any further sharp decline in prices, Mr. Pitts predicted that there would be many more bankruptcies than there have been.

Mr. Pitts complained that many manufacturers, being unable to sell the jobbers, because of the large stocks which the latter still have, have gone direct to the retailers and consumers with prices and terms as advantageous as those offered to the jobber. He said that this policy is unfair to the jobber and will eventually work evil to all manufacturers who are pursuing it. Mr. Pitts also made a plea for a larger percentage of profit for distributors on products having fixed resale prices.

He referred to the perennial agitation for the elimination of the middleman and particularly objected to the preaching of this doctrine by representatives of the Government. He said that field men employed by the United States Department of Agriculture have been preaching the elimination of the middleman to the farmers in many States.

Crannell Morgan, president National Supply and Machinery Dealers' Association, said that the dealers' chief problem to-day is the cost of distribution, which on account of the small volume of business sometimes reaches 35 to 40 per cent. He said, however, that the distributers are all optimistic and believe that the dawn of a better day is not far distant.

T. James Fernley, advisory secretary, National Supply and Machinery Dealers' Association, said that many manufacturers are trying to carry water on both shoulders. In other words, are trying to sell both to the distributers and to the distributers' customers. Mr. Fernley deplored this tendency and said that the interests of the manufacturers and distributers are so closely interwoven that one cannot suffer without the other suffering. He also referred to the withdrawal by many manufacturers of the 2 per cent cash discount and said that one way in which the manufacturers could help the jobber is to restore this discount.

Charles Coolidge Parlin, Curtis Publishing Co., Philadelphia, delivered a very interesting address on "Business of To-day and To-morrow," in which he alluded to selling as the biggest, and perhaps most important, problem of any business.

N. A. Gladding Elected President.

The convention of the American Supply and Machinery Manufacturers' Association closed Wednesday morning with the adoption of resolutions and the election of officers. There were only two resolutions, one opposing the excess profit tax and high surtaxes on personal incomes and urging Congress to reduce Government expenditures before considering any new plans of taxation; the other urging members of the association to support the various foreign trade financing corporations organized under the Edge law by investing in their securities.

Officers elected were as follows:

President, N. A. Gladding, E. C. Atkins & Co., Indianapolis; First Vice-President, Irving W. Lemaux, Indianapolis Brush & Broom Mfg. Co., Indianapolis; Second Vice-President, John C. Ruf, I. B. Williams & Sons, Dover, N. H.; Third Vice-President, S. D. Baldwin, Cincinnati Rubber Mfg. Co., Cincinnati, Ohio. Executive Committee, Joseph G. Deericks, Pittsburgh Steel Co., Pittsburgh; Dixon C. Williams, Chicago Nipple Co., Chicago; Edward Blake, Jr., Greenfield Tap & Die Corporation, Greenfield, Mass.; A. T. Simonds, Simonds Mfg. Co., Fitchburg, Mass.; H. F. Wright, Wright Mfg. Co., Lisbon Ohio.

All of the officers and members of the executive committee were elected by acclamation. Following the induction of the new officers, J. E. Kelly, Simonds Mfg. Co., Fitchburg, Mass., on behalf of members of the association presented the retiring president, Charles W. Beaver, with a diamond stickpin.

The conventions of the three associations were concluded with a joint session on Wednesday morning at which officers of the three organizations and prominent members made brief talks.

Confidence Being Restored Is View of Jobbers

"CONFIDENCE is being restored, situations which seemed insolvable are being cleared up, and we are drawing nearer to the dawn of a better day than the world has seen for many years," said Crannell Morgan, president National Supply and Machinery Dealers' Association, in his opening address at the sixteenth annual convention of that organization.

"While we have had losses through declines in inventory values this seems to have been long deferred, as other industries have had their declines, and from my investigation it would seem we have had a more suitable market than any other lines, probably because of the sound policy of the United States Steel Corporation, in refraining from excessive advances in prices and in taking full counsel of the facts and conditions before making any downward revision.

Steel Corporation Acted Wisely

"It is my view that the Steel Corporation has acted in thorough keeping with the necessities of the times and many of our members express the view that severe losses in the liquidation of their inventories were avoided by the policy of the Steel Corporation in holding prices until it was very clear what should be done.

"One of the factors which has served to force many of our members to go down in 1920 with large inventories was the acceptance of merchandise on order and the loss of sales through the lessening of buying, beginning probably with October, 1920."

The report of Thomas A. Fernley, secretary and treasurer, was in part as follows:

"Your association and all its constituent members have been doing their best to secure a premium of 2 per cent for anticipating the due date of bills.

"One of the group of manufacturers who appear to have been resisting the efforts to secure a reinstatement of the 2 per cent cash premium is that represented by the bolt, nut and rivet manufacturers, although many buyers believe that with the change in market conditions the cash premium of 2 per cent will shortly be restored.

Overstock Lists

"During the past year the overstock lists of the association have been continued and until November, 1920, many sales resulted from the distribution of the overstock list of various members. Since November, 1920, up to the time of this convention there have been a number of overstock lists distributed, but with a general condition involving a large inventory, not so many sales have resulted from the overstock lists, but there was great relief in the way of purchases and sales during the period of active business.

Readjustment of Compensation

"The association has reported to the members on several occasions concerning the steps taken to readjustment of the expense account so that the losses be-

between operating expenses and gross profit in the first four months of 1921 would be minimized.

Many members report having laid off from 15 to 33 1/3 per cent of the number of employees and of making necessary wage readjustment.

Open Price Association of Manufacturers

"Recently we have advised you of the unfavorable effect of the operation of some of the open price associations among the manufacturers, attention having been called to them by President Harding in his annual message indicating that they have probably been of great advantage to the manufacturers, but have been of disadvantage to the public.

"It is well understood that while the open price association conducted on the plan of reporting past transactions only may be entirely legal, it is likewise conceded that it takes very little to turn these organizations into the old style price agreement organization, and in fact many of them have had the same effect as the definite price agreements.

"Unfortunately these organizations have shown an entire lack of consideration for the distributer and appear to have as one of their principal activities combinations to withdraw such established trade customs as the cash premium from the distributer.

"If such organizations were sufficiently broad as to be inclined to treat the distributer with fairness, it is believed that there would be a better sentiment generally toward them not only on the part of the distributer, but on the part of the general public.

"Buyers will now be able to trade in the open market and it is hoped that many of the concessions which were withdrawn both as war measures during the war and as a result of the activities of these groups will be restored.

Machine Tool Cancellations

"A committee from your association has conferred on several occasions with a similar committee from the National Machine Tool Builders' Association on the subject of cancellation. Effort has been made within our industry to establish the principle that a sale is a sale and that cancellation is not to be permitted so that our industry shall not be on an uncertain basis where the possibility of loss shall be very great. These meetings with the cancellation committee of the National Machine Tool Builders' Association will be continued in an effort to arrive at a fair conclusion on the subject.

Stocks Average 25 Per Cent Above Normal

Information was exchanged by members present concerning the present business situation with particular reference to the condition of inventories, present activity of industries and prospects for activity. It was reported by various members that their inventories are from 20 to 30 per cent above normal.

A Pittsburgh dealer reported that his stock is 20 per cent below normal, but this was an exception to the general rule.

Some dealers did not see any hope of immediate improvement in business. Others said that they do not look for a large volume of business any time this year, but expect next year to be prosperous.

At the Tuesday morning session there were discussions of present conditions in various supply items such as bolts, nuts, rivets, vises, chucks, steel pulleys and twist drills. Manufacturers in these lines discussed these subjects from their own point of view. F. H. Chapin, vice-president Bourne-Fuller Co., Cleveland, reviewed the history of the bolt and nut industry. He referred to present conditions only briefly.

H. F. Seymour, Columbian Hardware Co., Cleveland, discussed the vise situation. At present workmen in some of the foundries manufacturing vises are out on strike due to their refusal to accept a reduction of 15 per cent in wages. Mr. Seymour said that any thought of advance in prices of vises can be put aside but as to whether reductions will come within the near future depends largely on the cost of labor and materials. He said that while pig iron prices have gone down considerably, he looked for an advance as soon as there was the slightest sign of buying activity.

R. T. Lane, Standard Tool Co., Cleveland, said that there are large stocks of twist drills on hand, his own company having the largest stock of goods it has ever carried.

William P. Simpson, American Pulley Co., Philadelphia, said that there had been two reductions in prices in steel pulleys, totaling about 20 per cent from the peak prices of last year. Future prices, he said, depend largely on the course of the steel market.

S. E. Horton, president Horton & Son Co., Windsor Locks, Conn., said that chuck prices will not change until business "has gone through its next cycle."

Various subjects were discussed at the Tuesday afternoon session, such as overhead costs, the basis of compensating salesmen and the matter of charging a nominal amount for local deliveries.

The meetings of this association were concluded Wednesday morning with the adoption of resolutions opposing the excess profit tax and the high surtaxes on personal incomes, opposing a general turnover tax and indorsing the program of legislation of the American Legion in the interest of disabled soldiers, sailors and marines.

Machine Tool Section Formed

An amendment to the constitution and by-laws of the association was adopted whereby there shall be a machine tool section devoted exclusively to the interests of members engaged in the machine tool business. This section shall have separate officers, consisting of chairman, vice-chairman and an executive committee of three members.

Election of Officers

Officers were elected as follows:

President—Crannell Morgan, Hardware & Supply Co., Akron, Ohio.

First Vice-President—in charge of machinery interest—L. H. Swind, Swind Machinery Co., Philadelphia.

Second Vice-President—Robert F. Blair, Pittsburgh Gage & Supply Co., Pittsburgh.

Executive Committee—two years: B. H. Ackles, T. B. Rayl Co., Detroit; W. R. Sostheim, G. B. Carpenter Co., Chicago.

Southern Supply Trade Lowest Since 1914

BESIDES participating in the joint session of the three associations on Monday afternoon, the Southern Supply and Machinery Dealers' Association held three sessions of its own, at which various subjects were informally discussed. Among the subjects were cancellation of contracts, the credit situation, local taxation, perpetual inventories, sales problems.

In his annual report Alvin M. Smith of Richmond, Va., secretary and treasurer, reported 156 members in good standing. He said that a questionnaire sent out to members on April 14 disclosed that the business of members has fallen to the lowest point since 1914. Orders are not only scarce, he said, but credit conditions are extremely bad throughout most of the South.

"Instead of a general spirit of co-operation toward stabilizing our industry," said Mr. Smith, "conditions for the past few months have shown an utter lack of respect for each other, a wild scramble to liquidate stocks bought at high prices, and a reaching out far beyond our natural territories in an effort to secure business, and a resulting disturbance of trade conditions entirely unwarranted and uncalled for.

"We in the South may not hope possibly for an early active resumption in trade, with cotton, tobacco and other staple crops selling at present prices. At the same time we realize that labor costs in the agricultural sections are considerably lower and the general costs of all things in use in our territory are much

lower; so that it is reasonable to expect that in the fall, if the market for our products develops, we may reasonably expect a gradual resumption of trade. Of course foreign conditions must be improved so that our surplus production may be exported on a favorable basis. We believe that until foreign conditions are corrected we cannot hope for real active business."

Mr. Smith said that members had been helped considerably in liquidating their surplus stocks by the sending out of lists of members of surplus goods held by other members. Thus there has been an exchange of stocks by supply houses in the South, the plan being to draw upon one another when possible rather than upon manufacturers' stocks.

There was reference in the report to the various court decisions in the matter of resale prices. Mr. Smith recommended that members of the association support the Kelly bill now before Congress which would solve the whole question by permitting the standardization of prices on trade-marked goods.

In concluding his report, Mr. Smith urged the members of his association to face the future with that spirit of determination and courage they have displayed in past crises and to face it bearing in mind that the United States is the richest nation in the world; that the South has unlimited resources, and that if the business of the members is handled on the high plane the association has stood for since its organization they need have no fear of the sheriff or any one else putting them out of business.

Only one resolution was passed by the association, that being in opposition to the Britten bill now before Congress which would change our weights and measures to the metric system.

J. H. McKinnon of the Cameron & Barkley Co., Jacksonville, Fla., was elected president; first vice-president is T. G. Hyman, Hyman Supply Co., Newbern, N. C.; second vice-president, James Biggs, Hardwicke-Etter Co., Sherman, Texas. Executive committee: W. Marshall Turner, Turner Supply Co., Mobile, Ala.; W. P. Simpson, C. T. Patterson Co., New Orleans, La.; E. L. Parker, Taylor-Parker Co., Norfolk, Va.; Fred W. Glover, Textile Mill Supply Co., Charlotte, N. C.

LOWER PRICES EXPECTED

Further Reduction of Manufacturing Costs Also Expected in the Youngstown District

YOUNGSTOWN, OHIO, May 24.—In conservative manufacturing circles, statements are heard that the steel industry will likely be obliged to still further reduce prices and scale down manufacturing costs all along the line. That these changes will be effected by mid-summer seems to be the general belief, at which time the industry is expected to start definitely, though slowly, on its upward movement. In the meantime, current buying is of a moderate character with indications that the usual mid-summer dullness will be more pronounced this year than usual.

Sheet buying has shown a pronounced tendency to fall off, new orders being in small lots. The resale market discloses a number of transactions at concession prices, the seller being in need of cash in most cases and willing to make a sacrifice. Makers of full finished sheets who have been receiving considerable tonnage from the automobile industry report a diminution in demand. Such sheets have sold at 5c. recently, with some indications of lower prices.

Strip steel buying has sagged in both hot and cold-rolled grades, and some business has been taken at prices substantially below nominal levels. Hot-rolled has sold down to 2.40c. and cold rolled to 5.25c.

Pipe Inquiry Leads

Pipe inquiry leads with independents at this time, oil producers continuing to take line pipe and casing, while some standard buttweld is going to the jobbing trade. That producers have been obliged to stock some pipe, even with production at 35 per cent., is indicated by the statement of the Youngstown Sheet & Tube Co. that it has added approximately 14,000 tons to the stocks of the Continental Supply Co., a distributing subsidiary.

Tin plate demand is weak with orders light when they are ordinarily at this time of the year numerous and for substantial tonnages. The market price of $6.25 per base box of 100 lb. is being shaded on some sales of stock sheets that are reported to have been worked off at $5.75. Makers are receiving small lot specifications on both stock and production plate. All of the tin plate mills of the Trumbull Steel Co. at Warren have been idle for a week. Another indication of the stagnation in the tin plate market is the suspension, effective from May 23, of the New Castle, Pa., plant of the American Sheet & Tin Plate Co., which had been operating at 50 per cent.

The principal supporting influence of the plate market is found in tank builders' requirements, though these are insufficient to keep production above 25 per cent.

While makers have considered some inquiries in the semi-finished market, including one for 15 tons of Bessemer sheet bars put out by a Cleveland interest, very little business is being placed. Producers say they are upholding current quotations in all cases.

Shipments Declined in April

One interest inclines to the belief that the industry is now in one of the most serious periods of depression this year, inasmuch as April shipments as a rule fell below those of March and May tonnage is still under that of April.

"Steel buying is spotty," states the president of an independent company. "We are trying to see how the least money can be lost; earnings are entirely out of the question."

In the face of reduced shipments, independents are experiencing difficulty in maintaining unfilled tonnage. Production generally is 30 per cent, while it has sagged in the sheet division to 25 per cent, the lowest point in several months. The sheet mill plants of the Youngstown Sheet & Tube Co., Brier Hill Steel Co., Falcon Steel Co. and Mahoning Valley Steel Co. are wholly suspended.

Only five of 25 blast furnaces are pouring in the Mahoning Valley; 17 of 51 independent open-hearths for a total of 29 with the Carnegie Steel Co. units are melting; one of the three Bessemer plants in the Valley is active; seven of the 17 tube mills; no independent bar mills and less than 50 per cent of the Carnegie company's units.

Newton Steel Co. leads in the percentage of sheet mills operating, its entire complement of 10 units being under power.

The raw materials market reflects the weakness of the steel situation, though heavy melting scrap prices have firmed within the past week. Sales involving prices up to $14.50 are reported. Hydraulically compressed has been sold at $10 to $10.50, though the nominal asking price is $11.

A recent resale transaction of ferromanganese involved a price of $78, though the average quotation in the resale market is from $80 to $85. Producers are holding for $90.

The Anniston City, the latest ship built by the Chickasaw Shipbuilding & Car Co., and turned over to the Isthmian Steamship Co., will begin loading this week at Mobile, Ala., with Birmingham rails and plates for the Orient, following the Selma City, which left last week with 7000 tons of rails and plates for the Manchurian railroad.

The Youngstown Sheet & Tube Co., Youngstown, Ohio, has received an order for 400 tons of sheets out of which will be manufactured Ohio automobile license plates for 1922.

Machinery Markets and News of the Works

BUSINESS UNIMPROVED

Machine-tool Buying Continues Light

American Locomotive Co. Purchase of Six 90-In Boring Mills the Largest Transaction

Machine-tool business continues extremely light with no apparent promise of early improvement. Some of the Cincinnati machine-tool builders report May business as better than that of April, but this is not the general situation, May having proved a very dull month with many sellers.

The most important transaction of the week was the purchase of six 90-in. boring mills by the American Locomotive Co. at a price reported to be about $70,000. At Chicago eight lathes have been sold to the Japanese branch of an American company. Otherwise business in all markets is confined almost wholly to single machines. The demand for second-hand tools is better in most sections than that for new tools.

Railroad buying is practically nil. The Chicago, Rock Island & Pacific has issued a list of a half dozen or more tools at Chicago and the Santa Fé is in the market for one machine. Some machine-tool builders who sell largely to the railroads are now revising their opinion as to the probable time for buying by the carriers, some of them predicting that no large buying will come before 1922.

The Harrisburg Foundry & Machine Co., Harrisburg, Pa., has issued an inquiry for about $80,000 worth of shop equipment, but is offering second-hand tools inventorying close to half of that amount in part payment.

No export buying of importance is developing from recent inquiries. Japan and China appear to be the most likely foreign buyers within the near future. The L. C. Harry Co., New York, is getting quotations on a small list of tools for South America.

New York

NEW YORK, May 24.

The only transaction of importance in the local market in the past week was the purchase by the American Locomotive Co., New York, of six 90-in. wheel boring mills at an aggregate cost of about $70,000. This company is also in the market for a driving wheel lathe, but the purchase of this may be deferred.

The Harrisburg Foundry & Machine Co., engine builder, Harrisburg, Pa., has issued an inquiry for about $80,000 worth of machine tools, but offers second-hand tools inventoried at close to half of that amount in part payment.

The Apollo Magneto Corporation, Kingston, N. Y., has issued an inquiry for a half-dozen tools.

The L. C. Harry Co., 114 Liberty Street, New York, is getting quotations on a small list of machines for shipment to South America.

Aside from the above-mentioned items, the local market continues very dull. Some sellers regard business as quieter within the past two weeks than during the preceding month. It is certain that there is no improvement and the trade has settled down for a rather long wait for a business revival.

The dullness in inquiries and purchases of cranes continues unbroken. The second-hand locomotive crane market is slightly more active than the new locomotive crane and overhead crane fields. The recent inquiry by Stone & Webster for a 30-ton overhead traveling crane for the city of Ashtabula, Ohio, resulted in the lowest bid being submitted by the Shaw Electric Crane Co., with the Cleveland Crane & Engineering Co. next and the Northern Engineering Works high bidder.

Among recent sales are: Chisholm-Moore Mfg. Co., two 6-ton chain hoists to Ira S. Bushey & Sons, foot of Court Street, Brooklyn, N. Y.; the Browning Co., a 20-ton locomotive crane to the Birdsboro Stone Co., Philadelphia; Shepard Electric Crane & Hoist Co., a 3-ton, single I-beam crane to the New England Steel Castings Co., East Long Meadow, Mass.; Pawling & Harnischfeger Co., a 30-ton, 52-ft. span overhead traveling crane to Westcott & Mapes, New Haven, Conn., for the United Illuminating Co., Bridgeport, Conn., and the Shaw Electric Crane Co., a 35-ton overhead traveling crane to Mitsui & Co. for export to Japan.

Three one-story automobile service and repair works, each 175 x 187 ft., for company cars, will be erected by the Shults Bread Co., 32 Court Street, Brooklyn, on Monroe Street, Jackson Street and Madison Street, to cost about $75,000.

The Algrotype Corporation, New York, has been incorporated with a capital of $100,000 by M. Stewart, A. Gross and J. G. Myerson, 342 Madison Avenue, to manufacture type-casting machines and parts.

The Scientilla Magneto Co., New York, has been incorporated with a capital of $200,000 by C. Herms, H. A. Bloomberg, and W. Kaufman, 1482 Broadway, to manufacture magnetos and other ignition equipment for automotive service.

The L. & H. Special Machine Co., Brooklyn, has been incorporated with a capital of $300,000 by A. E. Lindner, M. N. Hirsch and M. Morris, to manufacture machinery, tools, etc. Levy, Gutman & Goldberg, 215 Montague Street, represent the company.

The Active Metal Ceiling Co., New York, has been incorporated with a capital of $25,000 by E. C. Baxter, I. Henenfeld and H. Lutz, to manufacture metal ceilings and other metal products. E. F. Driggs, 44 Court Street, Brooklyn, represents the company.

Electric motors and other electrical equipment, mechanical apparatus and general glass-making machinery will be installed in the new plant to be erected by the Hires-Turner Glass Co., Thirtieth and Walnut streets, Philadelphia, Pa., on Tivoli Street, Albany, N. Y. It will be one-story, 150 x 300 ft., and is estimated to cost about $250,000 with machinery. A. W. Fuller, 95 State Street, Albany, is architect.

The P. C. A. Steel-Fibre Horse Shoe Co., New York, has been organized by G. H. Baker and N. Jaffe to manufacture horseshoes and similar products. The company is represented by Levy & Nemerov, 362 Fifth Avenue.

Freight handling machinery, loading, unloading and conveying equipment, etc., will be installed in the two new seven-story, reinforced-concrete warehouse buildings to be erected by the American Dock Terminal, 17 State Street, New York, at Tompkinsville, S. I. Plans for the structures have been filed. Two similar seven-story freight buildings will be erected at Clifton, S. I., by the Pouch Terminal, Inc., 17 State Street, New York, to be equipped with like hoisting and handling machinery.

The Pompeian Bronze Co., Brooklyn, recently organized, has leased space in the building at 603-11 Dean Street, totaling close to 5000 sq. ft., for the establishment of a new works.

J. Sichler & Co., Inc., Brooklyn, has been incorporated with a capital of $50,000 by F. E. Breyfogle, A. J. Swenson and C. K. Bohl, to operate a machine and repair works for the manufacture of automobile parts and other equipment. P. F. M. Ruther, 55 Wall Street, represents the company.

The Bakerite Gas Range Co., New York, has been organized by S. B. Fisher and C. Ruchberger, 351 East Fourth Street, to manufacture gas ranges and heating equipment.

The Directo Signal Co., East Orange, N. J., has been incorporated with a capital of $125,000 by Murray E. and G. M. Tucker, and Louis M. Sanders, 38 Walnut Street, to manufacture automobile signal devices and equipment.

The Bureau of Yards and Docks, Navy Department, Washington, will soon commence the erection of a hydrogen

plant at the new naval air station at Lakehurst, N. J. Bids have been taken for an electrically operated platform and hoist, and considerable other equipment of this character will be installed.

The Guardian Oil Burner Co., Hoboken, N. J., has been incorporated with a capital of $1,000,000 by Charles L. VonDreele, and I. H. Brand, 51 Newark Street, to manufacture oil burners and oil-burning equipment.

The Clifton Can Co., Passaic, N. J., has been incorporated with a capital of $250,000 by James A. Crowley, John Kelly and John H. McGuire, Passaic, to manufacture cans and other metal containers.

Nixon's Air Service, Inc., Paterson, N. J., has been incorporated with a capital of $50,000 by J. Fred, William L. and John J. Nixon, to manufacture airplanes and parts. Morris M. Cohn, 140 Market Street, represents the company.

The nickel plating department and other portions of the plant of M. Weiss & Co., 1144 Springfield Avenue, Irvington, N. J., manufacturer of nickeled and enameled hospital furniture, were destroyed by fire, May 15, with loss estimated at about $35,000.

The Cook Electric Co., 360-64 Jelliff Avenue, Newark, is planning the erection of a new one-story factory, 40 x 75 ft., for the manufacture of motors. It is estimated to cost about $22,000. S. S. Cook is head.

Philadelphia

PHILADELPHIA, May 23.

The Southwark Foundry & Machine Co., 430 Washington Avenue, Philadelphia, has filed plans for extensions and improvements in its molding shop to cost about $10,000.

Herman W. Meier, 563 North Fifth Street, Philadelphia, is having plans prepared for a one-story automobile service and repair building, 56 x 182 ft., at 510-12 North Fourth Street, to cost about $60,000. H. M. Kline, 1612 South Fourth Street, is architect.

The Department of City Transit, Philadelphia, has filed plans for the construction of a new power plant at Front Street and Fairmount Avenue, to cost about $50,600.

The Equipment Corporation of America, 11 South LaSalle Street, Chicago, manufacturer of contractors' machinery and equipment, has acquired the plant of the Vanadium Corporation of America, at Primos, near Philadelphia, for the establishment of branch works. Machinery will be installed at once.

The Tinius Olsen Testing Machine Co., 500 North Twelfth Street, Philadelphia, has completed arrangements with the Lippincott-Carwen Corporation, Erie Street, and the Carlson-Wenstrom Co., manufacturers of special machinery, for the manufacture of balancing machines formerly made by these organizations. Production will be carried out at the Tinius Olsen shops.

The Pan-American Recording Co., Camden, N. J., has been incorporated with a capital of $25,000 by Ralph L. Freeman, Charles K. Haddon and B. G. Royal, to manufacture recording instruments and parts. French & Richards, 106 Market Street, are representatives.

C. G. Cashman, Waynesboro, Pa., has acquired the plant of the C. W. Sexton Co., 81 West Main Street, manufacturer of stoves, heaters, ranges, etc., which recently was placed in a receivership. Plans are under way for the operation of the works for a similar line of production.

The Delaware, Lackawanna & Western Railroad Co., coal mining department, Scranton, Pa., has arranged a list of machine tools and equipment for installation at its machine shop and forge works at Forty Fort, Pa.

The Lebanon Grey Iron Castings Co., Lebanon, Pa., has been incorporated with a capital of $30,000 by Julius H. Caplan, and John Hunsicker, Jr., Lebanon, to manufacture iron and other metal castings.

The Board of Directors, Danville State Hospital for the Insane, Danville, Pa., has selected F. Arthur Rianhard, architect, Masonic Temple Building, Williamsport, Pa., to prepare plans for the new power house, estimated to cost about $65,000. William F. Shay, Watsontown, Pa., is president of the board.

The Harrisburg Corporation, Harrisburg, Pa., is being organized to take over the Smith-Waring Co. of this city, recently formed to manufacture a motor-driven tractor for farm service. Application for a State charter will be made at once. The new company has arranged with the Harrisburg Foundry & Machine Works, Seventh and Curtin streets, officers of which are interested in the new company, to use this plant for tractor and tractor part manufacture. Officers will include Alfred Sohland, vice-president and general manager of the Harrisburg Foundry & Machine Works; J. B. Schwab, local branch manager for the Standard Oil Co.; H. J. Weidinger, treasurer of D. G. Dery, Inc., Allentown, Pa., manufacturer of silk goods; and T. F. Rainsford, who will act as production engineer.

New England

BOSTON, May 23.

Sales of new machine tools are few. The most important transaction the past week was a 200-ton wheel press purchased by the Hartford & Springfield Street Railway Co., Warehouse Point, Conn. The Atlas Die-Casting Co., Inc., Worcester, Mass., has concluded purchases of metal-working equipment, including one 13 x 16-in. and one 6 x 6-in. high speed Peerless hack saw, but is negotiating for chucks, etc. A few machine tool interests consider the situation is a little better, but the majority reports no improvement. In one or two instances dealers are working on comparatively good prospects with a view to increasing production and decreasing the number of employees, but manufacturers appear in no hurry to buy. Practically all leading New England users of machine tools, however, are operating on reduced schedule and show little inclination to purchase new equipment. Some builders of machinery are stocking, but most of them are devoting attention to repair work and replacement of parts. Aside from a reduction of approximately 20 per cent on one line of grinding machines, prices remain unchanged.

Orders for gages involving several hundred dollars in each instance have been placed recently. The demand for small tools is less than it was May 1.

A better inquiry for chain hoists is noted from contractors and builders.

The Arey Mfg. Co., Worcester, capitalized for $35,000, has taken out a Massachusetts charter to manufacture appliances and automobile accessories. Ralph G. Arey, 257 Lincoln Street, is president, and John C. Avery, 340 Main Street, treasurer.

Thomas M. Gogin, 563 Lebanon Street, Melrose, is president, and W. Kennedy Mason, 237 Prospect Street, Cambridge, treasurer of Mason System, Inc., which recently took out a Massachusetts charter to make machinery, appliances, etc. It is capitalized for $99,500.

The Dana Machine Co. has been incorporated under Rhode Island laws to manufacture textile dyeing and finishing machinery and will immediately start operations in the foundry and machine shop of the Fuller Iron Works, Fox Point section of Providence, which it has acquired. It will also make a specialty of calender rolls. Frederick I. Dana is president, and T. Le Roy Harwood, treasurer Mariners Savings Bank, New London, Conn., is treasurer.

According to the Massachusetts charter recently granted the W. H. Phelps Co., Springfield, to manufacture chains, clamps, cleats, etc., provision is made for acquiring and equipping a foundry, workshops and other buildings. The company is capitalized for $750,000.

The Presbrey Stove Lining Co., Taunton, Mass., manufacturer of refractory products, has awarded contract to Franklin D. Williams, Taunton, for a one and two-story plant, to replace a portion of its works recently destroyed by fire.

The Auto Tool Co., 19 Harris Street, Pawtucket, R. I., has filed notice of organization to manufacture tools for automobile service. Charles A. Carpenter, 576 Cottage Street, heads the company.

The J. D. Crosby Co., Farrell Street, Pawtucket, R. I., has completed plans for a one-story foundry addition, 50 x 50 ft., for the production of iron castings.

The Regal Tool & Machine Co., Boston, has filed notice of organization to manufacture machinery and tools. William E. Conley and Herman B. Voight, 146 Oliver Street, head the company.

The Augur-Perry Co., New Haven, Conn., has been incorporated with a capital of $50,000 by G. H. Bishop, W. E. Perry and E. M. Augur, 2078 Chapel Street, to manufacture metal products, hardware specialties, etc.

The Star Sheet Metal Works, Boston, has filed notice of organization to manufacture sheet metal goods. Jacob Kramer and Lewis Blass, 136 Washington Street, head the company.

The Atlas Die-Casting Co., Worcester, Mass., recently organized with a capital of $200,000, has leased a factory at 41 Jackson Street and plans to begin production early in July, giving employment to about 300 operatives. The company is now purchasing equipment. Arthur M. Brewster,

Brookline, Mass., is president, and Malcolm F. MacNeil, 25 Brighton Avenue, Boston, treasurer.

The Andover Machine Co., Boston, has been incorporated with a capital of $120,000 to manufacture machinery and parts. Ivar L. Sjostrom, North Andover, Mass., is president and treasurer; A. M. Nolan and Clarence L. Newton, North Andover, are directors.

The Cortland Grinding Wheel Co., Cortland, N. Y., has completed arrangements with the Maxf Grinding Wheel Co., Chester, Mass., for the manufacture of its products at the latter's plant, forming a consolidation for this purpose. The Cortland company's plant was destroyed last November and will not be rebuilt at present. The officers of both companies will remain as heretofore.

The Trinity Mfg. Co., Taunton, Mass., has been incorporated with a capital of $95,000 to manufacture automobile hardware and other metal products. D. Leo Burke is president, and Joseph W. Falvey, 102 Bradstreet Avenue, Beachmont, Mass., treasurer.

A one-story power plant will be erected by the Security Mills, Inc., West Newton, Mass., in connection with the construction of an addition to its knitting mills. The structures will cost about $75,000.

The Badger Metal Products Co., Boston, has been organized by William C. Blackett and Arthur C. Badger, 175 Portland Street, to manufacture metal goods.

The Border Street Machine Shop, Boston, has filed notice of organization to operate at 148 Border Street, for the manufacture of machine parts, tools, etc. Edmund Leville heads the company.

Chicago

CHICAGO, May 23.

The machine tool market remains substantially the same as heretofore. Occasionally a dealer will do a fair day's business, as, for example, one house made sales of miscellaneous equipment one day the past week totaling about $18,000. On the whole, however, business is very light. Among the few recent orders of any size was a purchase of eight geared-in-head engine lathes, averaging about 16-in. swing, for shipment to a Japanese branch of a local company. Although railroads have bought nothing for weeks, the Rock Island has issued an inquiry for two 16-in. engine lathes, a 3-in. and a 2-in. turret lathe, portable punch and shear, bolt cutter and a 4-ft. heavy duty radial drill. The Santa Fe is asking for prices on a No. 13 Brown & Sharpe grinder. No price changes on standard tools have been announced of late. On light sheet metal machinery, however, the Peck, Stow & Wilcox Co., Southington, Conn., has made a reduction of 10 per cent. Local dealers' bookings have been so irregular thus far this month that it is difficult to forecast how total sales for May will compare with previous months this year. It seems doubtful at this writing whether any improvement will be shown.

The Ferro Mfg. Co., manufacturer of automobile specialties, 2011 South Michigan Avenue, Chicago, is receiving bids on a new plant to be constructed at Belvidere, Ill.

Whitney & Ford, dealers in plumbing supplies, 4325 Cottage Grove Avenue, Chicago, plan the construction of a machine shop.

The Gray Iron Foundry Co., Muskegon, Mich., has merged with the Alamo Furnace Co., Chicago, and the entire manufacturing equipment of the latter will be moved to Muskegon. The merged company will be known as the Smith-Gray Heater Co., and the officers are Charles Smith, president; C. H. Mee, vice-president; E. L. Meier, treasurer, and W. A. Meier, secretary.

The Harter Mfg. Co., manufacturer of electric light specialties, 525 South Clinton Street, Chicago, has awarded contract for the construction of a two-story plant, 100 x 125 ft., at 1850-58 Fulton Street, to cost $50,000.

The Ramspring Bumper Co., 110 South Dearborn Street, Chicago, has been incorporated with $1,000,000 capital stock by C. D. White, Leo J. Kramer and William Wilhartz. The first product which the company proposes to manufacture is an automobile bumper.

The Chicago Tube & Iron Co., manufacturer of mill and factory supplies, 1469 South Jefferson Street, Chicago, has purchased the block on West Forty-eighth Street, extending from Maplewood Avenue to Rockwell Street, 237 x 375 ft. The land is improved with a one-story building in three units and has a floor area of 61,000 sq. ft. The purchaser will occupy the property as soon as minor alterations are completed.

The Studebaker-Wulff Co., manufacturer of automobile tires, has options on three factory sites at Lincoln, Ill. It proposes to construct a plant containing 30,000 sq. ft. of floor space.

J. J. Kocher, architect, 6250 South Halsted Street, Chicago, will soon award contract for a one-story garage, 75 x 160 ft., for T. J. Kiernan, 5859 Prairie Avenue, to cost $40,000.

Wagner Brothers, 5630 Harper Avenue, Chicago, have had plans prepared for a one-story garage, 100 x 100 ft., to cost $35,000.

The Johnson Automotive Service Co. contemplates erecting a three-story plant, 80 x 118 ft., at Lyndale Avenue South, between Twenty-seventh and Twenty-eighth streets, Minneapolis, to cost $90,000.

D. C. Thwing, 945 Andrus Building, Minneapolis, will soon receive bids on a two-story garage, 70 x 152 ft., at 1315 La Salle Avenue, to cost $65,000. Bertrand & Chamberlin, Northwestern Bank Building, are architects.

Announcement is made of the formation of the Western Radiator Corporation to take over the interests of the Hooven Radiator Co. and the B. & W. Mfg. Co., both of Chicago. Manufacturing will be continued in the plant at 410-420 Northwestern Avenue, Chicago, where the B. & W. Mfg. Co.'s equipment is being moved. Additional equipment also has been provided. The factory has a floor space of 54,000 sq. ft. and a capacity of fully 2000 radiators a day.

The Atlas Copper & Brass Mfg. Co., 2734 High Street, Chicago, is taking bids for a one-story addition, 50 x 125 ft., to cost about $20,000. Louis Ehle, 3810 Broadway, is architect and engineer.

The Spark Plug Lock Co., 4010 North Central Park Avenue, Chicago, has been incbrporated with a capital of $100,000 by Frank J. Wilson, Charles T. Holst and William J. Cullerton, to manufacture ignition equipment and other automobile accessories.

The Durabilt Steel Locker Co., 300 Arnold Avenue, Aurora, Ill., has been incorporated with a capital of $100,000 by C. W. Killian, E. D. Kaser and Arthur McGrew, to manufacture steel lockers and kindred metal products.

The Western States Portland Cement Co., Independence, Kan., has broken ground for its new mills at Davenport, Iowa, to cost about $2,000,000, with machinery. A. D. Stancliff, Independence, is in charge.

The Barrett Tank Heater Co., Knoxville, Ill., has been incorporated with a capital of $100,000 by M. A. Barrett, H. A. Barrett and G. F. Hebard to manufacture heaters and heating apparatus.

The Lena Light & Power Co., Lena, Ill., is having plans prepared for a new hydroelectric power plant on the Pecatonica River, near Martintown, Wis., to cost about $70,000. Holland, Ackerman & Holland, 106 East Liberty Street, Ann Arbor, Mich., are engineers.

The Foss Motor Co., Faribault, Minn., is taking bids on revised plans for a new two-story service and repair building, 60 x 132 ft., estimated to cost about $50,000. H. H. Livingston, 55 South Eighth Street, Minneapolis, Minn., is architect.

Buffalo

BUFFALO, May 23.

The Williams Gold Refining Co., 2976-8 Main Street, Buffalo, has awarded a contract to the Hydro Construction Co., Mutual Life Building, for the erection of a one-story addition, 50 x 63, to its three-story plant. R. V. Williams is treasurer.

The Crescent Tool Co., 200 Harrison Street, Jamestown, N. Y., is having plans prepared for the erection of a new one-story power plant. Louis T. Klauder, Pennsylvania Building, Philadelphia, is engineer.

The Sage Radiator Co., Syracuse, N. Y., has been incorporated with a capital of $135,000 by C. S. Sage and A. E. Ellinger, to manufacture radiators and other heating equipment. Walrath & McCurn, O C S Bank Building, represent the company.

The Thatcher Process Co., Syracuse, N. Y., recently organized with an active capital of $200,000, has completed its new local electrochemical plant and will commence production at once. Carleton A. Chase and John Wilkinson, the latter vice-president of the H. H. Franklin Mfg. Co., head the company.

The Streif Corporation, Watertown, N. Y., has been incorporated with a capital of $60,000 by G. F. and F. Streif, and R. L. Maloney, Watertown, to manufacture washing devices and equipment for automobile service.

The plant of the George J. Meyer Grain & Malt Corporation, 1314 Niagara Street, Buffalo, was badly damaged by fire May 20. The estimated loss to machinery and equipment is $100,000.

Pittsburgh

PITTSBURGH, May 23.

The American Sheet & Tin Plate Co. has closed for a 15-ton, 77-ft. span overhead crane for its New Castle, Pa., works, with the Morgan Engineering Co., Alliance, Ohio., which is a duplicate of two other cranes now in operation at that plant. The Pittsburgh Screw & Bolt Co., Pittsburgh, has placed a 5-ton, 42-ft. span electric overhead crane with the Toledo Crane Co., Bucyrus, Ohio. The Milwaukee Electric Crane & Mfg. Co. was the successful bidder for a 5-ton 38-ft. span overhead crane for installation at the plant of the Ohio Brass Co., Mansfield, Ohio. These are the only important sales of the week in this section. Business in general still is pretty flat and would be extremely discouraging were it not that a fair number of inquiries is being received. The John F. Casey Co., Union Arcade Building, Pittsburgh, is asking for bids on a crane and other equipment for a pumping station for which it has the contract. The J. E. Moss Iron Works, Wheeling, W. Va., will probably close shortly for a 10-ton overhead electric crane, with 46-ft. 6-in. span, the award probably going to one of two Ohio manufacturers. Only small orders are coming in for machine tools, business in which generally is unsatisfactory. It is probable that the American Bottle Co., Newark, Ohio, will want a few tools in connection with the extension to its plant, structural steel for which recently was placed.

The Oliver Iron & Steel Co., Pittsburgh, manufacturer of bolts, nuts, rivets, etc., has filed plans for new four-story plant at Muriel and South Twelfth streets, to cost about $100,000.

The Sheet & Tin Plate Doubling Machine Co., McKeesport, Pa., has been organized by W. E. Davis and Burnett Jarvis, McKeesport, to manufacture an automatic sheet and tin plate doubling machine.

The Oberndorf Mfg. Co., 7509 Thomas Boulevard, Pittsburgh, manufacturer of steam fittings and supplies, etc., has acquired property in the vicinity of its plant, 192 x 203 ft., for $23,500, and will use the site for proposed additions.

The Monongahela Casting Co., Pittsburgh, manufacturer of metal castings, has filed plans for new one-story works at 505 Preble Avenue, Northside.

The Strubble & Reilly Motor Co., 113 Grant Street, Turtle Creek, Pa., is taking bids for a two-story service and repair building at Pennsylvania Avenue and Grant Street, to cost about $42,000. S. C. Richards, Masonic Building, Braddock, Pa., is architect.

J. F. McCreary & Son, Seventeenth Street, Beaver Falls, Pa., are taking bids for a two-story, automobile service and repair works, 50 x 94 ft., at Seventh Avenue and Seventeenth Street, to cost about $50,000. J. H. Hughes, Townsend Club, Beaver Falls, is architect.

The Osborne Machinery Co., Clarksburg, W. Va., has been incorporated with a capital of 75,000 by William F. and F. A. Osborne and Harvey E. Crites, Clarksburg, to manufacture machinery and parts.

The Nitro Mfg. & Mine Supply Co., Nitro, W. Va., has been incorporated with a capital of $200,000 by F. T. Letchfield, Nitro; E. A. Bailey and T. R. Redding, both of Fairmont, W. Va., to manufacture machinery and parts, mining equipment, etc.

Hood & Dent, Weston, W. Va., have plans under way for a two-story addition to their automobile service and repair works, 70 x 150 ft., estimated to cost about $35,000.

Baltimore

BALTIMORE, May 23.

The Electric Hose & Rubber Co., Twelfth Street, Wilmington, Del., manufacturer of metal armored rubber hose, etc., has filed plans for its one-story addition, 57 x 90 ft. C. D. Garrettson is general manager.

Electrical and mechanical equipment, transmission machinery, etc., will be installed in the new sugar refining plant, to be erected on the Christiana River, Wilmington, by the Wilmington Sugar Refining Co., recently incorporated with a capital of $30,000,000. Work on the plant, lately curtailed, will be resumed at once. The new mill will be located on an 11-acre tract and is estimated to cost close to $1,000,000. Adolph Segal, Philadelphia, is president of the company.

Fire, May 19, destroyed a portion of the plant of the United States Flashless Powder Co., Carrcroft, near Wilmington, Del., with loss estimated at about $60,000.

The Eastern Hardware & Supply Co., 37-39 South Charles Street, Baltimore, has been incorporated with a capital of $500,000 to manufacture hardware products. The incorporators are Charles J. Schnepfe, Jr., James C. Murphy and Edward H. Lange.

The Metal Products Corporation, Washington, has been incorporated with a capital of $500,000 by H. F. Cook and James J. Roberts, Washington; and Lewis S. Mack, R. F. D. No. 2, Farmington, Del., to manufacture adjustable metal caps for locking bottles, with spring attachments.

The Centennial Cotton Gin Co., Twelfth Avenue and Twelfth Street, Columbus, Ga., will develop a capacity of three complete cotton ginning machines daily at its new plant. A list of machine tools and other equipment to be installed has been arranged. K. R. Lummus is secretary and treasurer.

Fire, May 16, destroyed a portion of the plant of the Allendale Cotton Oil & Fertilizer Co., Allendale, S. C., with loss estimated at about $75,000, including equipment.

The Brewer Automobile Headlight Co., Cedartown, Ga., recently organized, is arranging for the establishment of a new plant for the manufacture of automobile headlight frames and equipment; a manufacturing and assembling department will be installed. I. L. St. Clair is president, and N. E. Bowden, secretary and treasurer.

The Metals Repair & Supply Co., Falls Church, Va., has been incorporated with a capital of $200,000 by Charles R. Allen and Edward T. Fenwick, Falls Church, to manufacture metal products and operate a general machine repair works.

The Bureau of Yards and Docks, Navy Department, Washington, will soon commence the erection of a new one-story machine shop at the navy yards at Hampton Roads, Va.

The Solomon Ink Saving Co., Alexandria, Va., recently organized, will operate a local plant for the manufacture of printing machinery and parts. Randolph Solomon is president, and Raleigh T. Green, secretary.

The American Steel Coiling Co., Baltimore, is planning the construction of a factory at Monument and Eighth streets for the manufacture of iron and steel rods, etc. W. Y. Schall will be superintendent.

Cleveland

CLEVELAND, May 23.

Machine-tool business continues very light. The only favorable report comes from a local manufacturer of drilling machinery who has received a number of single tool inquiries from the East the past week or two. In this section little business is coming from any line of industry and what demand there is is mostly for used machinery.

A large number of crane builders are expected to bid on the 400-ton gun handling crane for the proving ground at Lower Station, Md., for which the Navy Department will receive bids May 24.

A moderate amount of activity has developed recently in hydroelectric equipment. The Wellman-Seaver-Morgan Co., Cleveland, has taken an order for three 7500-hp. vertical turbines for Takata & Co., Japan, to operate under a 140-ft. head at 300 r.p.m. The generators will be supplied by the General Electric Co. and will be built by that company in Japan. The Wellman-Seaver-Morgan Co. has also taken two 750-hp. vertical turbines to be operated under a head of 22 ft. at 150 r.p.m. for the city of Idaho Falls, Idaho, to drive two 625 k.v.a. General Electric generators, and for two 1100-hp. single vertical turbines which have been purchased by the Government for its Shoshone development project in Wyoming. These turbines will operate from heads of 120 to 220 ft. at a speed of 600 r.p.m. and will drive 750 k.v.a. generators. The International Paper Co. has placed three 10,000-hp. turbines with the I. P. Morse Co., Philadelphia, to drive generators supplied by the General Electric Co. and to be installed at the Sherman Island plant near Glen Falls, N. Y. The International Paper Co. is also planning the purchase of two 1800-hp. turbines and generators for its Saranac River development in New York. The New England Power Co. is inquiring for a 7250-hp. turbine and generator for its plant in Searsburg, Vt.

The H. B. Young Motor Truck Co., Euclid, Ohio, is reported to have purchased the Geneva Casting Co.'s plant, Geneva, Ohio, and will convert it into works for the manufacture of motor trucks.

The Ohio Ice Machine Co., Columbus Road, Cleveland, plans the erection of a factory and office building, 50 x 100 ft.

The Washington Motor Co., Eaton, Ohio, is planning a one story addition, 50 x 100 ft.

The Rex File Co., Newcomerstown, Ohio, is having plans prepared for the erection of a brick addition to its plant, to cost about $200,000, including machinery. Paul E. Heller,

of the Heller Brothers Co., 879 Mt. Prospect Avenue, Newark, N. J., is head of the company.

The Quinley Magnesia Co., Cortland, Ohio, recently organized with a capital of $100,000, is planning the erection of a factory for the manufacture of asbestos and magnesium products, the initial unit to be ready for operation in about 60 days.

The Ohio Ice Machine Co., 1579 Columbus Road, Cleveland, manufacturer of ice machinery, will soon break ground for a new one and two-story plant on Madison Avenue, near West Fifty-eighth Street, 50 x 100 ft., to cost about $25,000. The general contract has been let to Carl A. Schlecht, 321 Engineers' Building.

Cincinnati

CINCINNATI, May 23.

A better feeling is noted among manufacturers and dealers in machine tools. While April was perhaps as poor a month as has been experienced this year, the first three weeks of May are showing up much better, and in the past week several local manufacturers have received a few fair-sized orders. Most of these were for engine lathes, though a maker of planers booked two machines the past 10 days. A number of inquiries, mostly for single tools, are still outstanding, however, but considerable difficulty is being experienced in getting buyers to close. Dealers report a slight improvement in sales, particularly in used equipment. One local branch of a large sales organization states that during the past week or two results obtained from an intensive selling campaign were highly satisfactory, the whole organization having practically cleaned up a large list of used tools. Some activity is noted among manufacturers of coal mining equipment, and a list is expected from the Louisville & Nashville Railroad for new repair shops to be constructed this summer. So far the Big Four has taken no action on its $80,000 list issued several weeks ago.

The city of Hamilton, Ohio, is contemplating the erection of a municipal light and power plant to replace the one now in use. The City Council has appropriated $5,000 to make a survey of the situation, and an engineer will be employed to make a recommendation as to whether the present plant will be enlarged or a new one built.

The Ohio Electrolytic Oxygen Co., Cincinnati, has purchased property adjoining its plant on Kenyon Avenue, and is contemplating the erection of an addition within the year.

Fire, May 20, destroyed the forge and blacksmith shop, and engine house of the Allied Coal Co., Zanesville, Ohio. The structures will be rebuilt.

Detroit

DETROIT, May 23.

The City Council, Detroit, has authorized the expenditure of $5,000,000 for the construction of a power plant for the new municipal electric railroad lines. Between five and six acres at the foot of Twenty-fourth Street have been set aside as a building site.

The Rupright Engineering Co. has been organized by Muskegon, Grand Haven and Holland, Mich., men to manufacture the Rupright gasoline motor, invented by Frederick Rupright, Grand Haven. James A. Hoover, of the Heinz Pickle Co., Holland, is president; Mr. Rupright, vice-president, and C. E. Misner, Grand Haven, secretary-treasurer.

The Home Hot Blast Furnace Co., Grand Rapids, Mich., has started work on the erection of an addition.

The machine shop of William Cote, Lansing, Mich., recently damaged by fire, will be rebuilt immediately.

The Common Council, Union City, Mich., is disposing of a bond issue of $150,000, the proceeds to be used for the construction of a municipal hydroelectric power plant. Holland, Akerman & Holland, 106 East Liberty Street, Ann Arbor, Mich., are engineers.

The Monroe Binder Board Co. and the Boehme & Rauch Co., Monroe, Mich., manufacturers of paper board products, have been merged under the name of the Monroe Consolidated Paper Co., with a capital of $7,500,000. It is expected to develop an output of 1100 tons of material per day. E. C. Rauch is president.

The Ford Motor Co., Detroit, is planning to enlarge its works at Hamilton, Ohio, for the manufacture of Fordson tractors and parts. It is expected to give employment to about 5000.

The Street Railway Department, City of Detroit, is considering the erection of a new one-story car shop, 260 x 370 ft., at St. Jean and Shoemaker Streets. Ross Schram, Murphy Building, is secretary.

The Motors Metal Mfg. Co., Detroit, is said to be planning to rebuild the portion of its works destroyed by fire May 7, with loss estimated at about $50,000, including equipment.

Milwaukee

MILWAUKEE, May 23.

Scattering orders for machine tools continue to be received, but the aggregate of business is very small. The automotive industries furnish the main source of business. The demand for tools remains limited to the barest necessities and in view of the relatively small percentage of operations, even these needs are unusually light. Some export inquiry is reported, but inquirers are very slow in responding to quotations.

Further reductions of working forces have been put into effect in local machine shops as well as foundries. A conservative estimate is that machine shops of all descriptions are operating on an average of 40 or 45 per cent. The best showing is made by certain firms supplying machinery for road construction, oil production and motor vehicles.

The H. W. Johns-Manville Co., Milwaukee, will proceed with the work of constructing and equipping its new plant at Waukegan, Ill., projected at an estimated investment of $6,000,000, and replacing the present asbestos and roofing products plant in Wauwatosa. Work was started more than a year ago, but has proceeded haltingly. Reduction of wages in the building trades and more favorable prices of materials has induced the company to resume work with the intention of pushing it to completion. The Rauif Construction Co., 53 Patton Building, Milwaukee, is general contractor.

The Magnetic Mfg. Co., 764 Windlake Avenue, Milwaukee, has started construction on a new machine shop and office building costing about $45,000 equipped, on South Pierce Street, near Twenty-fourth Avenue. It will be of brick and steel, with steel sash, two stories, 91 x 120 ft., the office being 30 ft. sq. R. H. Stearns is president and J. P. Bethke, secretary and treasurer. The general contractors are Meredith Brothers, 1043 Kinnickinnic Avenue.

The L. J. Mueller Furnace Co., 187-197 Reed Street, Milwaukee, manufacturer of steam, hot water and hot air heating systems, boilers, stoves, tanks, etc., has increased its authorized capitalization from $750,000 to $1,000,000 to accommodate the development of its business. It contemplates no further enlargement of the works immediately. Gustave C. Mueller is president and general manager.

The Pressed Metal Mfg. Co. is the new style adopted by the Pull-Easy Mfg. Co. of Waukesha, Wis., established several years ago to manufacture a line of patented specialties for the automotive industries. The business has been developed to embrace a wide range of stampings and other similar metal products.

The Nordstrom-Lamboy Vulcanizing & Machinery Co., Milwaukee, will establish its plant and headquarters at Wisconsin Rapids, Wis. It makes patented molds and other devices for manufacturing and repairing tires. A three-story ell-shaped building, 42 x 52 ft. and 55 x 75 ft. will be erected at once. A small list of tools, including grinders, drill presses, miller, etc., is being purchased. Marston & Lamboy, Milwaukee, are architects and consulting engineers.

The Metallic Mfg. Co., Collins, Wis., has filed articles of incorporation with a capital stock of $30,000 to manufacture metal office furniture, fixtures and windows of all-metal construction, and similar specialties. Carl G. Hallberg is president, and Emil H. Waack, secretary and treasurer.

Imanski & Gehrmann, Milwaukee, have awarded contracts for the erection of a public garage, service station and machine shop at Twenty-third and Forest Home Avenues. It will be ell-shaped, 81 x 36 x 112 x 106 ft., one story and part basement, of brick and steel. Aug. W. Wolff is architect.

The Voreclone Mfg. Co., capitalized at $100,000, and the Voreclone Corporation, with $25,000 capital, filed incorporation papers during the week. The application for a charter states that the companies are organized to manufacture machinery and deal in trade marks, patents, inventions, etc. The incorporators include H. G. Biggam, H. A. Schlick and Waldemar C. Wehe, attorney, 425 East Water Street, Milwaukee. No statement concerning the plans is available.

The United Motor Truck Body & Cab Co., Glenwood, Wis., has been granted a charter to manufacture commercial car bodies, truck cabs, etc. The capital stock is $50,000 and the incorporators are Charles Preeshl, Ray B. Lightfoot and Frank J. Preeshl, all of Glenwood.

The Flambeau Paper Co., Park Falls, Wis., has commissioned George F. Hardy, consulting engineer, 309 Broadway,

New York City, to design a pulp mill addition, new office and a warehouse, together with enlargement of the hydroelectric generating plant. The estimated cost of the improvements is $250,000. Guy Waldo is secretary and manager.

The Board of Education, Marinette, Wis., has let the general contract to the Miechie Construction Co., 86 Michigan Street, Milwaukee, for the erection of a junior high and vocational training school and an addition to the present high school at a bid of $198,243. Manual training and other equipment will be purchased later.

Indiana

INDIANAPOLIS, May 23.

The International India Rubber Corporation, 310 West Ewing Avenue, South Bend, Ind., is planning for the erection of a two-story and basement addition to its plant.

The Perkins Corporation, Mishawaka, Ind., has been incorporated with a capital of $750,000 by C. A. Carlisle, Sr. and Jr., E. H. Williams and Fred L. Hunt, Mishawaka, to manufacture gasoline engines, feed grinders and similar machinery.

The Sunbeam Electric Appliance Co., Milwaukee, Wis., will commence the removal of its plant to Evansville, Ind., in June. It is planned to develop a capacity of about 50 complete electrically operated washing machines per day. The company recently took over the plant and business of the Surf Mfg. Co., Milwaukee, manufacturer of Surf washing machines, and is now operating at this works. W. A. Carson is president.

Henry Lang, one of the heads of the George S. Anderson Foundry Co., Jeffersonville, Ind., under a partnership, has acquired a controlling interest in the company. No change in present operations will be made. Mr. Lang has been identified with the organization since 1880.

The American Coating Mills, Elkhart, Ind., manufacturer of coated paper products, has awarded a contract to Henry L. Vanderhouse, Kalamazoo, Mich., for its three-story addition, 100 x 160 ft., estimated to cost about $600,000 with machinery. C. C. Colbert is president and treasurer.

Fire, May 13, destroyed a building at the plant of the Stutz Motor Car Co. of America, Indianapolis, with loss reported at about $100,000. W. N. Thompson is president and general manager.

Officials of the Kalamazoo Tank & Silo Co., Brazil, Ind., have organized the Kalamazoo Clay Co., to operate at the plant of the Carbon Mining Co., Carbon, recently acquired. The factory will be equipped for the manufacture of patented building blocks, and will also establish machinery for clay mining at the pits of the former owner. The new company is headed by Manvel H. Coombs, John S. Rockwell and James E. Anderson.

The Claypool Machine Co., Claypool, Ind., has been incorporated with a capital of $70,000 by D. W. and J. D. Cripe, and W. E. Black, Claypool, to manufacture machinery and tools.

The Western Airline Co., Seymour, Ind., recently incorporated with a capital of $50,000, is planning for early production at new plant, now being established. It is proposed to develop a capacity of one complete airplane per day. Later the works will be extended to include a department for the manufacture of aircraft motors, in the meantime such equipment will be manufactured in Cincinnati. C. E. Lay, J. H. Andrews and E. C. Franz head the company.

The Central South

ST. LOUIS, May 23.

The Louisville & Nashville Railroad Co., Louisville, has awarded contract to the George H. Remmel Co., Louisville, for the construction of a new one-story boiler shop, 100 x 100 ft., at Paris, Tenn., for locomotive boiler construction and repair work.

The South Covington Concrete Block Co., South Covington, Ky., has been organized to manufacture concrete building block and kindred products. The company is headed by Thomas F. Marshall and Charles J. Schlosser, Covington.

The Elkhorn Table & Mfg. Co., Praise, Ky., recently organized, will purchase considerable wood-working machinery for installation in a local building which has been leased for its new plant. G. D. Johnson is president.

The William C. Krauth Electric Co., 115 West Market Street, Louisville, has arranged for an increase in capital to $50,000, to manufacture parts for electrical apparatus and operate an electrical repair works. William C. Krauth is president and manager.

The Kansas City Foundry Co., Kansas City, Kan., will defer the erection of its addition until early in the fall. It will be one-story, 65 x 130 ft. E. C. Austin is secretary.

Earl Gates, Bevier, Mo., and associates, have acquired coal property in the vicinity of Lingo, Mo., and will establish a general coal mining plant and build a steel tipple on the site.

An electric power plant to cost about $100,000 will be constructed by the Excelsior Laundry Co., Grand and Bell streets, St. Louis, in connection with a new two-story mechanical laundry, 100 x 140 ft. B. T. Kearns is president.

H. T. Purnell, Beggs, Okla., and associates, have leased a site at Henryetta, Okla., for a new one-story machine shop, 100 x 140 ft., for the manufacture of oil well equipment, parts, and repair work.

The City Council, Cookeville, Tenn., has disposed of a bond issue of $100,000, the proceeds to be used for the erection of a hydroelectric power plant at Burgess Falls. A. P. Barnes is mayor.

S. T. Odell, Johnson City, Tenn., is taking bids for a new one-story and basement wagon and metal works, 42 x 162 ft., to cost about $22,000.

The Premocar Automobile Co., 2109 Olive Street, St. Louis, has been organized to manufacture automobiles and parts. William Piskulic is president, and E. A. Rotayik, secretary and treasurer.

The Willis-Smiley Producing & Refining Co., Fort Scott, Kan., has been organized to build a new oil refinery in the vicinity of Springfield, Mo. The initial plant will have a daily capacity of about 500 bbl. W. E. Willis and W. J. Smiley, Fort Scott, head the company.

The Producers Storage Co., Medill, Mo., is planning for the installation of new ice-making and refrigerating machinery at its plant. The present building will be remodeled and improved.

The Common Council, Germantown, Tenn., has selected Gaines & Carlisle, 206 Falls Building, Memphis, Tenn., architects and engineers, to prepare plans for the new municipal electric power plant. Bids will be asked at an early date. P. S. McKee is mayor.

The City Council, Wellington, Kan., is having plans prepared by Benham & Mullergren, Firestone Building, Kansas-City, Mo., engineers, for a new municipal electric power plant, estimated to cost about $60,000. L. A. Walton is city clerk.

Maouse Brothers, Emporia, Kan., have plans under way for a new two-story automobile service and repair building, 50 x 130 ft., at 726-30 Commercial Street. W. F. Marx, Emporia, is architect.

The Standard Steel Works, Kansas City, Mo., 1722 Tracy Street, will equip a plant for the manufacture of ventilating appliances.

The Corning Ice Co., Corning, Ark., will equip cold storage plants at Success, Knobel and Peach Orchard, Ark., and is in the market for refrigerating machinery.

California

LOS ANGELES, May 17.

The C. F. Braun Co., San Francisco, manufacturer of iron and steel products, castings, etc., is planning for the removal of its foundries to Los Angeles.

The Excello Products Co., Los Angeles, has been organized to manufacture machinery and tools. It is headed by H. D. Eberle and Harry C. Newman, care of Hickcox & Crenshaw, 817 H. W. Hellman Building.

The Pacific Coast Steel Co., Rialto Building, San Francisco, is having plans prepared for the erection of a one-story, steel frame plant building at South San Francisco, 80 x 400 ft.

The Pacific Clay Products Co., American Bank Building, Los Angeles, manufacturer of fire brick and other refractory products, has plans under way for new works at Los Nietos, near Los Angeles, to replace the buildings recently destroyed by fire. E. M. Durant is president.

The John F. Riley Co., 260 North Pacific Boulevard, Huntington Park, Cal., is having plans prepared for a new one-story automobile service and repair building, 105 x 150 ft., to cost about $42,000. Edward L. Mayberry, 468 Pacific Electric Building, Los Angeles, is architect.

The Bureau of Yards and Docks, Washington, is completing the erection of a new ship-fitters' shop at the Mare Island Navy Yard, near Oakland, Cal., and will commence the installation of machinery at an early date. It is expected to have the shop ready for service in July and is estimated to cost $2,250,000. The building will be divided into three sections, each averaging 100 x 700 ft., and will be used as

an angle shop, plate shop and forge and blacksmithing works. A mold loft will be located over one of the bays.

The Minerals, Metals & By-Products Co., Denver, Colo., has acquired property on San Mateo Bay, San Mateo, Cal., as a site for its new plant. The tract totals about 1380 acres, a considerable portion of which is under water, and will be reclaimed. Preliminary plans for the project are under way and it is said that it will cost about $2,000,000 for completion. L. C. Rogers is president.

The Board of Education, Berkeley, Cal., is completing plans for the construction of a new power plant at the local high school, to cost about $50,000. William C. Hays, First National Bank Building, San Francisco, is architect.

The Big Four Motors Co., Sacramento, Cal., is considering the erection of a new plant at Richmond for the manufacture of motor trucks.

Canada

TORONTO, May 23.

An improvement was noted in the machine-tool market the past week and many inquiries recently received are about to turn into sales. Used machinery is in fair demand and small tools have also improved. Wood-working machinery, however, is the most active.

W. A. Aubury, Avonmore, Ont., is asking for a used 16-in. screw cutting lathe.

Edward T. Smith, Anagance, Kings County, N. B., is in the market for a small buzz planer about 8 or 10-in. head, suitable for planing hardwood or rough lumber.

G. L. Whidden, Lower Wentworth, N. S., is in the market for a used direct current generator, 30 to 40-hp., 110 volt, capable of giving from 600 to 700 amperes, complete with switchboard; also used lighting plant with or without batteries.

The Vineland Canneries, Ltd., Vineland Station, Ont., are in the market for a duplex boiler feed pump for two 125-hp. boilers, 2-in. intake and 1½-in. discharge; also tees, nipples, check valves, etc. W. A. Whitney is manager. Used equipment will be considered if in good condition.

The Robert Bell Engine & Thresher Co., Ltd., Seaforth, Ont., is in the market for a 15 or 20-hp. electric motor, three-phase, 25 cycle, 220 volts.

The Bates Valve Bag Co., Ltd., Niagara Falls, Ont., has been incorporated with a capital stock of $50,000 by Charles Ballard, John J. Bampfield, George Mortimer and others to manufacture bags and machines for making and filling bags, etc.

The Walker Twist Drill & Tool Co., Ltd., Walkerville, Ont., has been incorporated with a capital stock of $750,000 by Harrington E. Walker, Gustavus G. Banfield, both of Walkerville; Harry N. Reynolds, Detroit, and others to manufacture tools, reamers, instruments, taps, cutters, etc.

The Jack Frost Ice Machine Co., Ltd., Toronto, has been incorporated with a capital stock of $1,000,000 by Albert Mearns, Bay and Melinda streets; Gerald M. Malone, Bertram K. Johnston and others as provisional directors to manufacture refrigerating machinery, electric and other pumps, etc.

The Auto Rim Co., Ltd., Toronto, has been incorporated with a capital stock of $250,000 by John D'A. Bradford, 24 King Street West; George K. Lucas, Jacob H. Greenberg and others to manufacture automobile rims, parts and machinery, etc.

A. Maurice, Box 241, Sturgeon Falls, Ont., is in the market for a small cupola, blower and other equipment.

The Gulf States

BIRMINGHAM, May 23.

The T. J. Barnett Co., Palatka, Fla., operating a local machine and forge shop, has acquired property, 275 x 300 ft., and plans the erection of a new foundry and other buildings, for the manufacture of ice-making and refrigerating machinery. The company was recently organized with Welden Henley as president, and H. F. Lecks, secretary.

The Shav-Rite Safety Razor Corporation, Palm Beach, Fla., has been incorporated with a capital of $1,250 000 by Stanley M. Kattell, James H. Whiting and George W. Coleman, all of West Palm Beach, to manufacture safety razors, blades and other cutlery.

The Robertson Carburetor Co., Ninth Street and Second Avenue, Birmingham, Ala., has awarded a contract to F. E. Russell, Birmingham, for a new one-story plant to manufacture carburetors and other ignition equipment.

Freight handling equipment will be installed by the Board of Port Commissioners, New Orleans, in connection with the proposed new wharf, 75 x 600 ft., to be constructed on the waterfront at an estimated cost of $400,000. The structure will be used by the Mississippi-Warrior Barge Line. W. O. Hudson is president of the board.

The Samuel Kaufman Co., Lake Charles, La., has been organized to manufacture agricultural implements. The company is headed by Samuel and W. C. Kaufman, Lake Charles.

The City Council, Quincy, Fla., has arranged for a bond issue of $175,000, the proceeds to be used for the construction of a municipal hydroelectric power plant.

The Monroe Cotton Oil Co., Newtown, near Monroe, La., is planning to rebuild its plant, destroyed by fire, May 11, with loss estimated at about $150,000, including machinery.

The Alamo Iron Works, San Antonio, Tex., is considering the establishment of a new branch plant at Houston, Tex.

George R. Hill, Tyler, Tex., and associates, are contemplating the establishment of a brick manufacturing plant, with daily capacity of about 10,000 bricks.

The Haynesville Light & Power Co., Haynesville, La., is planning for the erection of a new ice-manufacturing and refrigerating plant, to be operated in conjunction with its local electric plant.

The Rose City Petroleum Co., 407 Donaghey Building, Little Rock, Ark., recently organized with a capital of $500,000, has preliminary plans under way for a new refinery, with initial capacity of about 1000 bbl. A. M. Delcambre is president, and E. B. Fowler, secretary and treasurer.

The James P. Sutton Steel & Structural Iron Foundry, St. Andrew and Rousseau streets, New Orleans, has plans under way for rebuilding its foundry, recently destroyed by fire with loss estimated at about $18,000. It will be one-story, 110 x 150 ft.

The Dallas Wheel & Rim Co., Dallas, Tex., has been incorporated with a capital of $35,000 by C. J. Kennedy, Frederick and H. L. Prior, Dallas, to manufacture metal wheels and rims for automobile service.

The Talladega Foundry & Machine Co., Talladega, Ala., has completed installation of $30,000 worth of new equipment for the manufacture of street-white-way work, both gas and electric, plain and ornamental cast iron lamp posts, etc. This is in addition to the facilities which the company has had in the past for a general jobbing business in cast-s with daily capacity of 15 tons. E. W. McDonald is president and general manager.

Office and Trade Changes

Offices of the Brown-Zortman Machinery Co. have been removed from the Union Arcade to 325 Second Avenue, Pittsburgh.

The Pittsburgh district sales offices of the Northern Engineering Works, Detroit, has been removed from room 991 to room 594 Union Arcade, Pittsburgh. J. B. Laird is district sales manager.

The National Steel Co., 111 West Washington Street, Chicago, has established as its district representative P. B. Granger, 2165 Commonwealth Avenue, St. Paul, Minn., who will cover Minnesota, North and South Dakota and Iowa, handling a complete line of sheet steel, cold drawn bars in all analyses, and hot and cold rolled strip steel.

Sales of the Gordon cam turning lathe, manufactured by the Willard Machine Tool Co., Cincinnati, have been taken over by the Motch & Merryweather Machinery Co., Cleveland, Cincinnati, Detroit and Pittsburgh.

The Gierhoitt Gas Motor Co., of Detroit, has moved its offices to the plant at Marysville, Mich.

The Black & Decker Mfg. Co., Towson Heights, Baltimore, Md., has opened a Kansas City branch office at 1711 Grand Avenue.

The name of the Chain Products Co., Norwalk, Conn., has been changed to the H. & O. Chain Co.

The corporate name of the Stenman Electric Valve Grinding Co., 42 Southbridge Street, Worcester, Mass., has been changed to the Worcester Electric Tool Corporation.

The Bayonne Bolt & Nut Co., Bayonne, N. J., has established a New England district sales office at 324 Old South Building, Boston, in charge of J. A. McAuliffe, who was formerly with the purchasing department of the Hog Island shipyard and previous thereto with Stone & Webster.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	3.23c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	3.23c.
Hoops, base price	4.15c. to 4.28c.
Bands, base price	3.88c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.23c. to 3.33c.
Channels, angles and tees under 3 in. x ¼ in., base	3.23c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.23c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.43c.
Toe calk, ½ x ⅝ in. and larger	3.75c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.50c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.73c.
Squares, flats and hex	5.23c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.23c. to 3.33c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.23c. to 4.25c.
No. 12	4.28c. to 4.30c.
No. 14	4.33c. to 4.35c.
No. 16	4.44c. to 4.45c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.95c. to 5.18c.	.....
Nos. 22 and 24	5.00c. to 5.23c.	5.60c.
No. 26	5.05c. to 5.28c.	5.65c.
No. 28	5.15c. to 5.38c.	5.75c.
No. 30	5.40c. to 5.63c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	5.00c. to 5.38c.
No. 16	5.25c. to 5.63c.
Nos. 18 and 20	5.40c. to 5.78c.
Nos. 22 and 24	5.55c. to 5.93c.
No. 26	5.70c. to 6.08c.
No. 27	5.85c. to 6.23c.
No. 28	6.00c. to 6.38c.
No. 30	6.50c. to 6.88c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt	—46	—30	¾ in Butt	—18	List
¾ in. Butt	—52	—37	1-1½ in. Butt.	—20	— 2
1-3 in. Butt	—54	—40	2 in. Lap	—14	+ 3
3½-6 in. Lap.	—49	—35	2½-6 in Lap..	—18	— 2
7-12 in. Lap..	—40	—24	7-12 in. Lap..	— 7	+10

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c.
Annealed soft	4.50c.
Galvanized annealed	5.25c.
Coppered basic	5.00c.
Tinned soft Bessemer	6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 c. to 19¼c.
High brass wire	18¼c. to 21¾c.
Brass rod	16 c. to 20¾c.
Brass tube, brazed	30½c. to 31½c.
Brass tube, seamless	20½c. to 21½c.
Copper tube, seamless	22½c. to 23½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. to 24c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Worsters
IC	$11.10	$10.00	80 lb.	$7.30	7.05
IX	12.30	11.25	90 lb.	7.40	7.15
IXX	14.10	12.75	100 lb.	7.50	7.25
IXXX	16.10	14.75	IC	7.70	7.45
IXXXX	17.70	16.50	IX	8.60	8.35
			IXX	9.60	9.35
			IXXX	11.00	10.75
			IXXXX	12.00	11.75

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$8.00
IC	8.25
IX	8.50
Fire door stock	11.50

Tin

Straits pig	35c.
Bar	40c. to 42c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¾c. to 7c.
Sheet zinc, No. 9 base, casks	12c. open 13c.

Lead and Solder*

American pig lead	6c.
Bar lead	6½c. to 7c.
Solder, ½ and ½ guaranteed	24¼c.
No. 1 solder	21½c.
Refined solder	18½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	30c. to 33c.

Old Metals

Prices are a little higher this week and business more active. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.50
Copper, heavy and wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.75
Brass, light	4.00
Heavy machine composition	9.75
No. 1 yellow brass turnings	5.00
No. 1 red brass or composition turnings	7.50
Lead, heavy	4.00
Lead, tea	3.00
Zinc	3.00